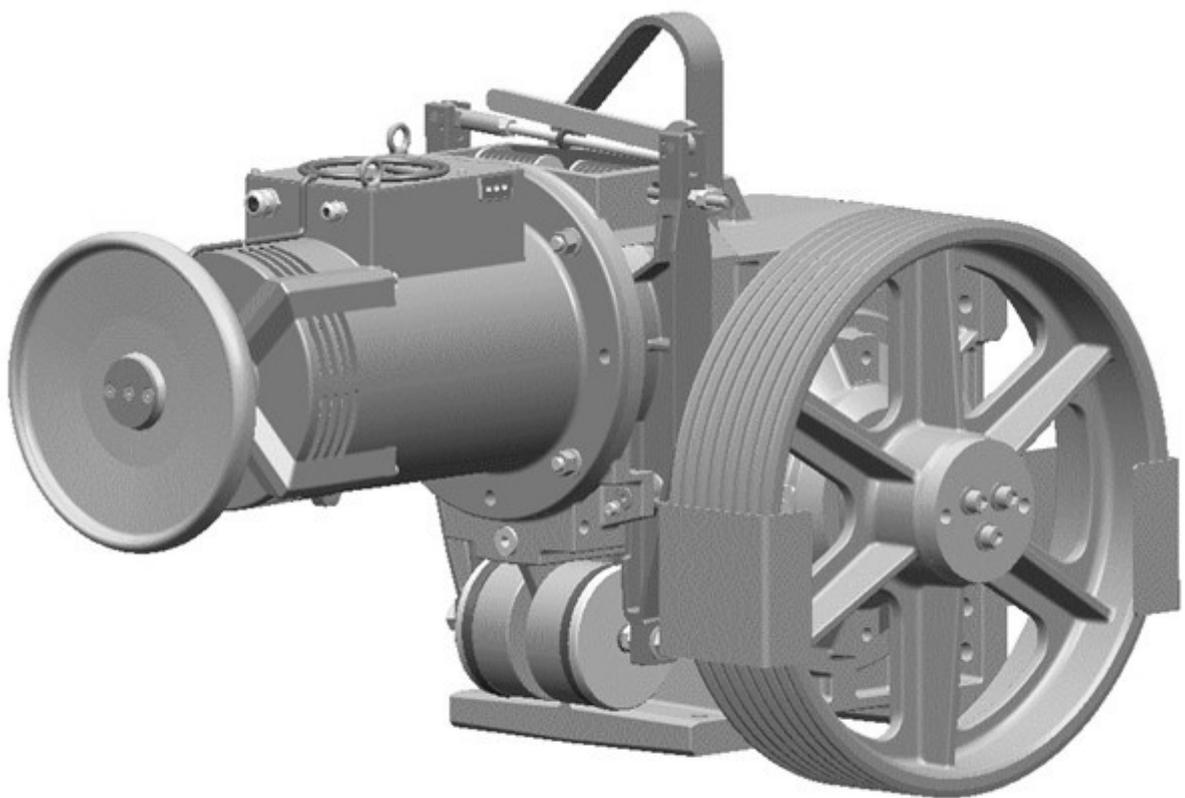


OPERATING MANUAL

TW130

Drive
05/2025



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TKE

Company and contact information

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1 About these instructions

1.1 Guide to layout

Sequence of actions involving several steps

✓ Requirement for the sequence of actions (optional).

1. First action step.
2. Second action.
 - ▷ Interim result (optional)
3. Third action step.
 - ▷ Result of action (optional)

Sequence of actions involving independent steps

- Action step.
- Action step.
- Action step.

Information



Information must always be read and followed.

Reference

↗ [Chap. 1 P. 6](#)

List

- Top item of a list
 - Sub-item of a list
 - Sub-item of a list
- Top item of a list
- Top item of a list

2 Safety

2.1 Warning notes

- Warning notes are intended for the protection of persons and property.
- Warning notes must be read and observed by every person who works on the product.
- Warning notes precede activities that pose a hazard for people and the product.

2.1.1 Structure

SIGNAL WORD AND SIGNAL COLOUR



Type and source of danger

Consequences if danger disregarded.

→ Measures to avert the danger.

2.1.2 Indications of danger to persons

DANGER



Danger with a high degree of risk!

If ignored, leads to death or serious injury.

→ Read and comply with the warning.

WARNING



Danger with a high degree of risk!

If ignored, may lead to death or serious injury.

→ Read and comply with the warning

CAUTION



Danger with a low degree of risk!

If ignored, may lead to minor or moderate injury.

→ Read and comply with the warning.

2.1.3 Indication of possible damage to property

NOTICE



Hazard with possible damage to property!

May lead to product function impairments or function loss.

→ Read and comply with the warning.

2.2 Safety requirements

This document contains important information for safe operation of the product.

- Keep this document and all other applicable documents at the location of use for the entire working life of the product.

2.2.1 Area of applicability

This document applies only to the product described here.

Other applicable documents

- International occupational health and safety regulations

2.2.2 Basic requirements for safety

- All existing safety devices are to be tested regularly in accordance with the maintenance schedule.
- This document, in particular the chapter entitled "Safety", together with the warnings and all other applicable documents, must be followed by all persons who work with the product.
- In addition to this document, the rules at the location of use with regard to environmental protection and the occupation health and safety and accident prevention regulations must be followed.
- All safety and hazard warnings on the installation must be kept in legible condition.
- Safety information and instructions required by law must be displayed to users in such a way that they are clearly visible.
- A requirement for safe handling and non-disruptive operation of this product is knowledge of the fundamental safety regulations.

2.2.3 Obligations of the operating company and installation firm

- Only deploy trained and instructed qualified personnel.
- Provide personnel with the required personal protective equipment.
- Check personnel at regular intervals to ensure that they follow safety-conscious work practices and comply with national provisions.
- Make all other applicable documents as well as this document available to personnel.

2.2.4 Duties of personnel

- Clearly establish all areas of responsibility prior to any activity.
- Always wear the personal protective equipment made available to you.
- Prior to work, make people aware of the dangers of electrical current.

2.2.5

Dangers in handling the drive

DANGER



Residual voltage after switching off the elevator installation!

Electric shock that can lead to death or severe injury.

- Perform work on energised parts of the drive only after the waiting period and/or when the DC link voltage is less than 60 V (check with a measuring instrument)

WARNING



Inadequate connection

Electric shock. Damage to drive.

- Earth the motor and brake magnet in accordance with country-specific regulations.
- Electrical connections must correspond to at least the protection class in accordance with the name plate and/or required country-specific protection class.

WARNING



Contact with rotating or moving parts!

Entanglement of clothing or body parts can lead to crushing or even loss of limbs.

- Maintain an adequate distance to rotating and moving parts, for example traction sheave, ropes.
- Wear tight-fitting clothing.
- Make sure you assume a firm stance.

- The drive may only be operated in a closed machine room or secured shaft.
- The machine may only be operated with the cover and rope guard fitted to the traction sheave.
- The drive is not suitable for operation in explosive or aggressive atmospheres.
- On entering the machine room, adequate safety clearance to all rotating parts is to be maintained.
- In the event of improper use of the machine, there is a risk of personal injury or to the life of the user or third parties, or impairment on the assembly or other assets can arise. Malfunctions that can adversely affect safety must be rectified immediately.
- It must be ensured that a fault generated by the encoder, the brake or the brake control system is detected by the elevator control system or frequency inverter. The control system must immediately place the elevator in a safe state.
- The elevator installation must ensure that emergency braking by the mechanical brake system takes place in the following cases:
 - Uncontrolled movement out of the stopping zone

- Failure of the inverter (due to short circuit with triggering of the fuse)
- The elevator installation must be fitted with a safety device complying with EN81 or A17 that detects exiting the elevator car with the door opened and initiates suitable measures.

2.3 Warranty and liability

The "General Terms of Sale and Delivery" of TK Aufzugswerke GmbH apply.

Warranty and liability claims in the event of personal injury and material damage shall be excluded if they arise due to at least one of the following causes:

- Improper use that is not in line with the intended purpose of the product
- Incorrect installation, commissioning, operation and maintenance of the product
- Operation of the product with defective or inoperative safety and/or protection devices
- Non-observance of the instructions in the operating manual with regard to transport, storage, installation, commissioning, operation and maintenance
- Structural modification to the product without agreement or approval
- Modification to product features without agreement or approval
- Inadequate monitoring of parts that are subject to wear
- Repairs that are carried out improperly
- Cases of catastrophe due to third-party interference or force majeure
- Use of non-approved auxiliary materials and operating fluids

2.3.1 Structural modification of the product

The product is configured in the factory and delivered ready for operation.

If changes are made to the product, the entire warranty of TK Aufzugswerke GmbH shall become null and void.

2.3.2 Use in line with intended use

The product has been constructed using state-of-the-art technology and in line with the recognised technical safety regulations. It may only be used in accordance with its intended use and when the technical safety devices are free from defects. Any other or additional form of use shall be regarded as **non-compliant** with the intended use. TK Aufzugswerke GmbH shall **not** be liable for any damage arising from such use and any damage arising due to operator errors.

In order to comply with the intended use of the product:

- Use the product as a Drive of elevators only
- Read and comply with the document, in particular the chapter entitled "Safety", together with the warnings and all other applicable documents
- Comply with the commissioning instructions, the installation description as well as the required inspection and maintenance work

2.4

10 rules for health and safety at work



Field

10 RULES PREVENTION OF AN ACCIDENT

Lock Out – Tag Out (LOTO)

Always test & verify.

Ensure there are no passengers in the cab. All doors are closed and mechanically locked.

Guard any circuit that may not be de-energized on a locked out controller: e.g 110 V lighting.

Always have the unit personally locked before working on the unit if it is not to be moved.



Fall Protection

Always tie-off when a fall hazard of 1.8m or more exists.

Always wear proper work attire: full body harness.

Inspect your full body harness before each use.

Always be aware of your surroundings, especially at heights of more than 1.8m and with a gap of more than 300mm.



Jumpers

Always count jumpers before and after use.

Inspect jumpers for damage. Only use approved jumpers.

Jumpers may not be installed on the safety circuit when the elevator is in automatic operation. Always notify co-workers when jumpers are being used.



Personal Protective Equipment (PPE)

Always wear the proper Personal Protective Equipment.

Always wear proper work attire and if necessary: safety shoes, helmet, eye protection, hearing protection and protective gloves.



NO JOB IS SO IMPORTANT
OR URGENT THAT IT CANNOT
BE DONE IN A SAFE WAY.



OSH
BECAUSE WE CARE

Car Top And Pit Access

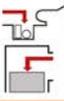
Maintain control of the elevator at all times.

Access: Car top - Send the car up/down, open the door (Door-Lock) and fix with door stopper. Independently verify door safety, stop switches and inspection switch.

Pit - Activate pit stop switch and use ladder safely.

Egress: ensure stop switches are activate when exiting car top or pit.

Pit - Deactivate stop switch(es) and use ladder or step aids safety.



Live Electrical/Troubleshooting

Use certified tools and prevent incidental contact with live electrical circuits.

Probe with only one hand.

Lock Out and Tag Out if power is not required.

Inspect tools before use.

Always guard live circuits.

Test meter on a known source before use.



Mechanical Stored Energy

Avoid pinch points of materials and tools.

Avoid loose clothing and be careful when wearing gloves near moving machinery.

Ensure all loads are stable and secure.

Avoid the red zones (leaning over to adjacent shaft etc.).



Rigging & Hoisting

Verify stability & capacity.

Inspect rigging equipment before each use.

Ensure load slings are properly sized.

Ensure load will clear all obstructions.

Do not stand or walk under load being hoisted.



False Cars & Running Platforms

Operate with two means of safety.

Always use safeties and governor if hoisting with original machines.

When using a temporary cable climbing hoist a secondary Blocktop is required.

Governor and/or safety foot pedal is required.

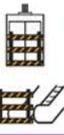


Barricading

Secure workplace properly with barricades.

When swing doors, automatic doors, steps, stepreads, pallets, comb-plates, comb-plate teeth, floor plates or trap doors have been removed or have not been installed leaving an open fall hazard, the unit has to be secured with barriers (for escalators at both ends).

Barricades are to be secured to the unit when work is not being performed in the area.



The international rules for occupational health and safety can also be found on our online platform ELI for download at: <https://eli.tkelevator.com/support/occupational-safety-health>

2.5 Personal protective equipment

Danger	Cause	Risks	Remedy	Equipment
	<ul style="list-style-type: none"> Unprotected shaft Unprotected cabin roof 	Falling		Safety harness
 	<ul style="list-style-type: none"> WARNING! Do not walk underneath suspended loads Falling tools Transport of heavy loads Sharp-pointed objects 	Head injury		Head protection
 	<ul style="list-style-type: none"> WARNING! Do not walk underneath suspended loads Falling tools Transport of heavy loads Sharp-pointed objects 	Danger of crushing in the foot area Cut or stab injury in the foot area		Foot protection
  	<ul style="list-style-type: none"> Sharp objects Mechanical parts Sharp-pointed objects Caustic substances 	Danger of crushing in the hand area Stab injury in the hand area Acid/alkali burns		Protective gloves
	<ul style="list-style-type: none"> Severe noise pollution 	Noise damage		Ear protection
 	<ul style="list-style-type: none"> Flying parts Flying particles Laser beams Emissions of optical rays 	Eye injury Loss of sight/blinding		Protective goggles
	<ul style="list-style-type: none"> Electrical voltage 	Electric shock		Enable source of energy

3 Description

3.1 Standards and legal requirements

The product complies with the following regulations:

- Directive 2014/34/EU
- DIN EN 81-20:2020-06
- DIN EN 81-50:2020-06
- DIN EN 81-77:2023-02



For operation in line with standards, the elevator installation must comply with each standard.

3.2 Product Group TW Machines

The designation of this series (successor generation of W series) is composed of the combination of TK Elevator, Wormgear (TW) and a figure for the main performance point (e.g. Q = 1600 kg → 160) of the machine, as well as an indicator of the generation (e.g. "B").

As part of further technical development, these machines are designed completely with low-friction rolling bearings.

The use of a synthetic gear oil (polyalkylene glycol with additives) not only increases the power density and the gear efficiency, but also extends the oil change intervals.

3.3 Product

The machine TW130 (**TK Elevator Wormgear**, Q=1300 kg) is used for traction elevators within the framework of the TW series (machines with worm gear, anti-friction bearings, lubrication with synthetic gear oil).

Conceived for installations with rated load 1300 kg at 1.6/2.5 m/s , machine TW130 consists of a worm gear with integrated operational brake, overhung traction sheave, flange-connected three-phase motor in design IMB5/V1.

Design variants for the motor and traction sheave positions:

Motor position	Traction sheave position	NBS
Vertical	left	with/without
Horizontal	left/right	with/without

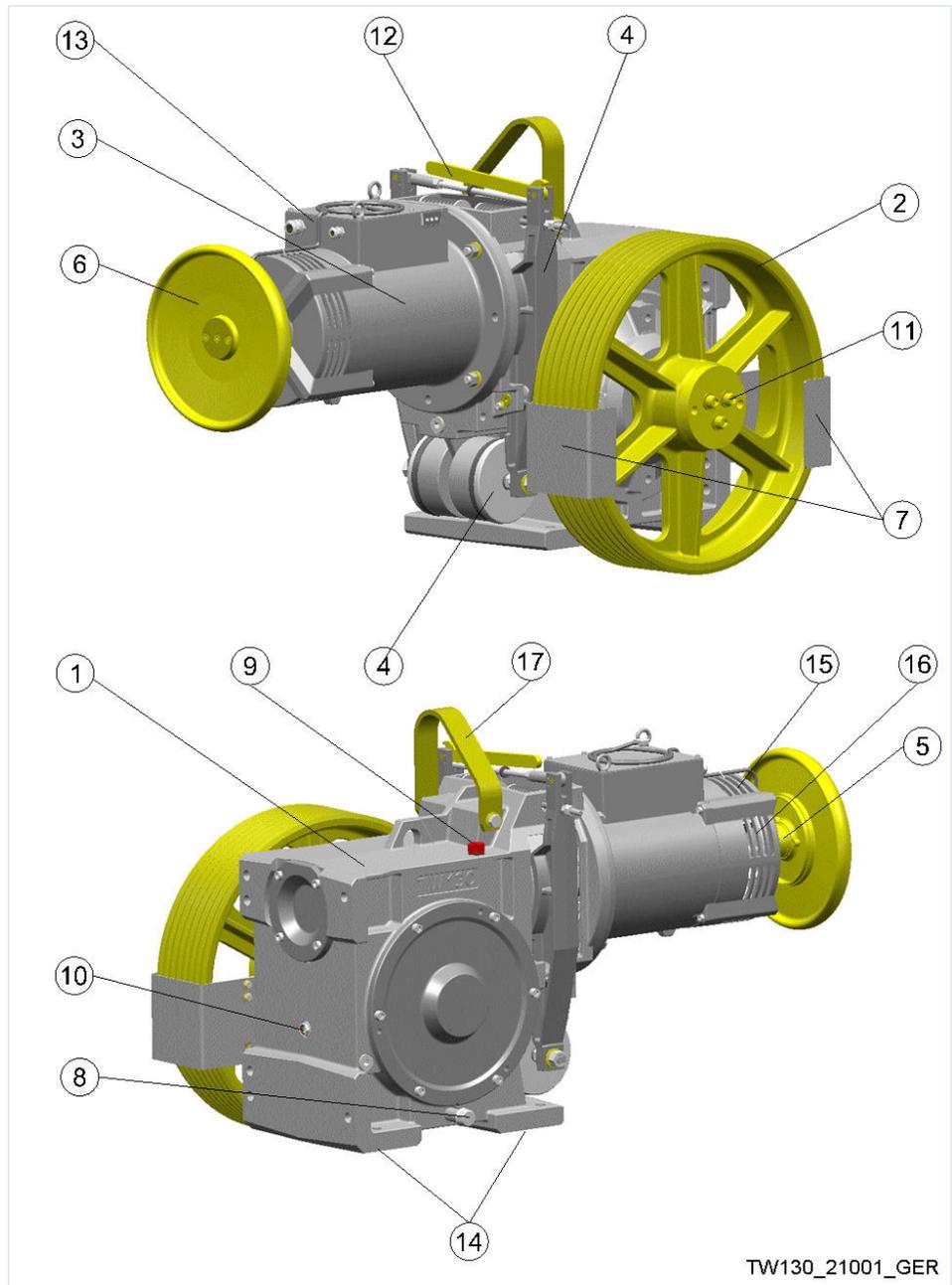
Tab. 1

ATR_1_21_0001_0

The variation of the traction sheave position – left/right – is achieved in this machine by means of two different gear box casings each with an integrated bearing bracket on the traction sheave side.

- The machine is exclusively available with frequency-controlled motors (VVVF).

IMB5 version with horizontal motor position (shown is machine with right-hand traction sheave position)



TW130_21001_GER

Fig. 1

ATR_2_12_0107_0

Item	Designation	Item	Designation
1	Driving gear	2	Traction sheave (standard version)
3	Motor in IMB5	4	Operational brake
5	Encoder (type WDG100)	6	Handwinding wheel
7	Rope guard (adjustable); only in the case of traction sheaves with diameters DT=540, 640 and 720 mm	8	Oil drain (3/4")
9	Oil filling hole with casing ventilation	10	Oil level monitoring (gauge glass)

Item	Designation	Item	Designation
11	Traction sheave mounting	12	Brake release lever (mounted)
13	Motor terminal box with connection	14	Mounting surface for machine base frame
15	Internal ventilator for motor cooling	16	Air vents for motor
17	Transport hanger (for transport only)		

Version with motor position – vertical IMV1 (machine shown with frequency inverter motor version)

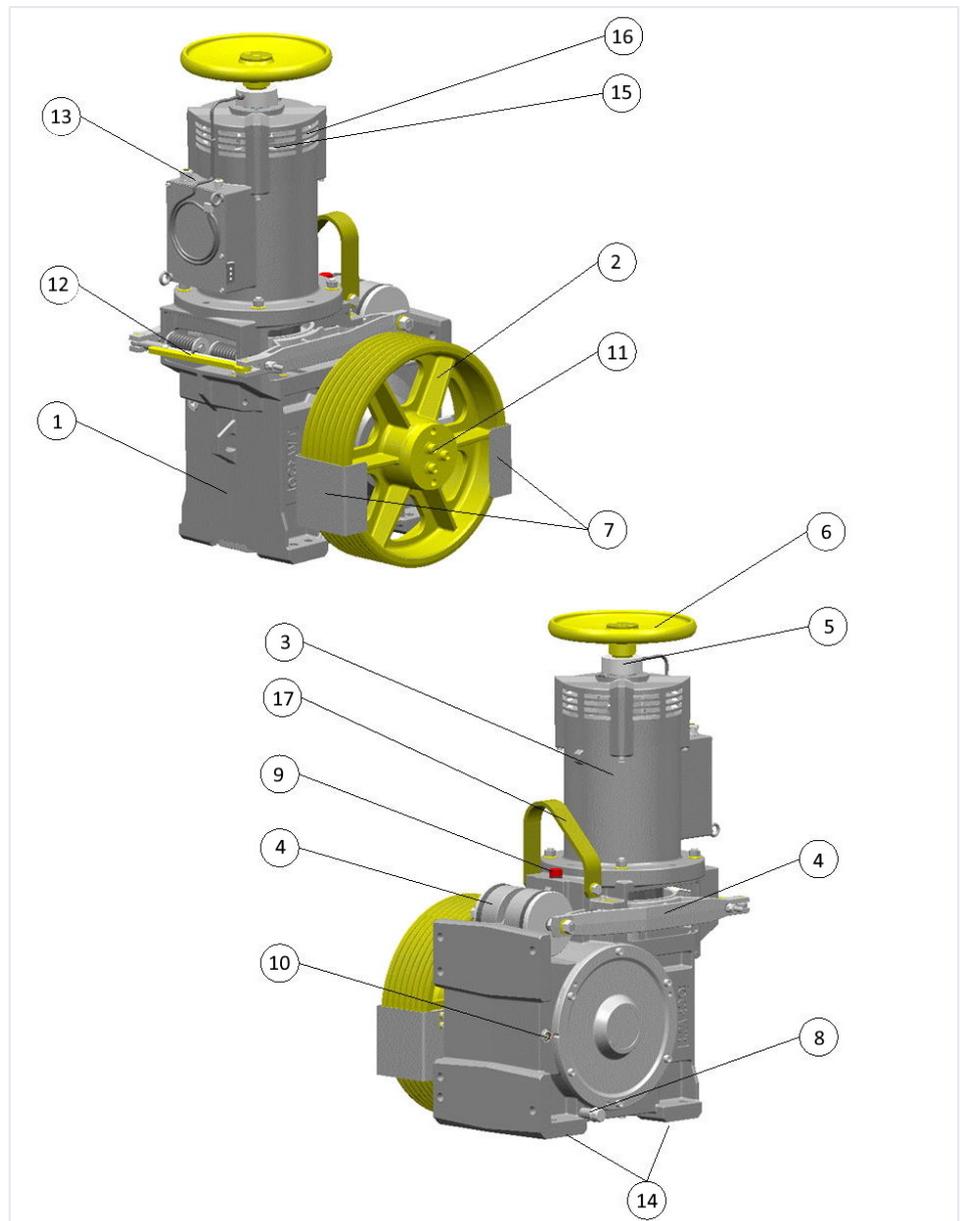


Fig. 2

ATR_2_12_0108_0

Item	Designation	Item	Designation
1	Driving gear	2	Traction sheave (standard version)

Item	Designation	Item	Designation
3	Motor (frequency inverter version) in IMV1	4	Operational brake
5	Encoder (type WDG100)	6	Handwinding wheel
7	Rope guard (adjustable); only in the case of traction sheaves with diameters DT=540, 640 and 720 mm	8	Oil drain (3/4")
9	Oil filling hole with casing ventilation	10	Oil level monitoring (gauge glass)
11	Traction sheave mounting	12	Brake release lever (fitted) with securing clip
13	Motor terminal box with connection	14	Mounting surface for machine base frame
15	Internal ventilator for motor cooling	16	Air vents for motor

Version with NBS emergency brake system (shown in the horizontal motor position, and right-hand traction sheave position)

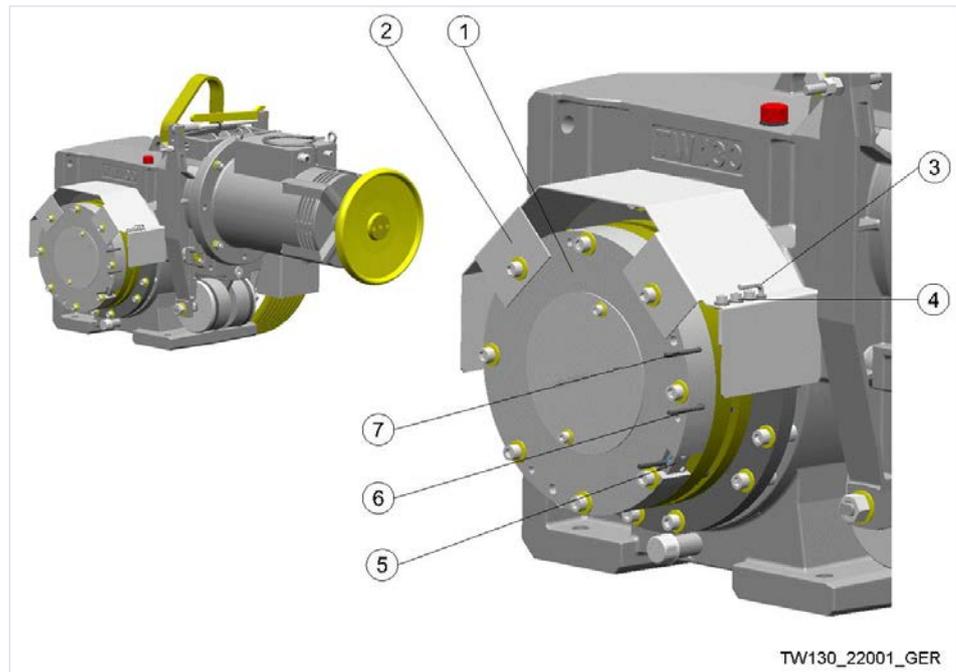


Fig. 3

ATR_2_12_0109_0

Item	Designation	Item	Designation
1	Disc brake – emergency brake system	2	Cover plate for brake
3	Socket wrench for manual release	4	Screws for manual release (screw head marked in red)
5	Brake test switch with connection line	6	Connection line, brake voltage
7	Protective cover for brake		

Version with traction sheave in the shaft – SA9 (machine shown in vertical motor position and upward rope pull direction)

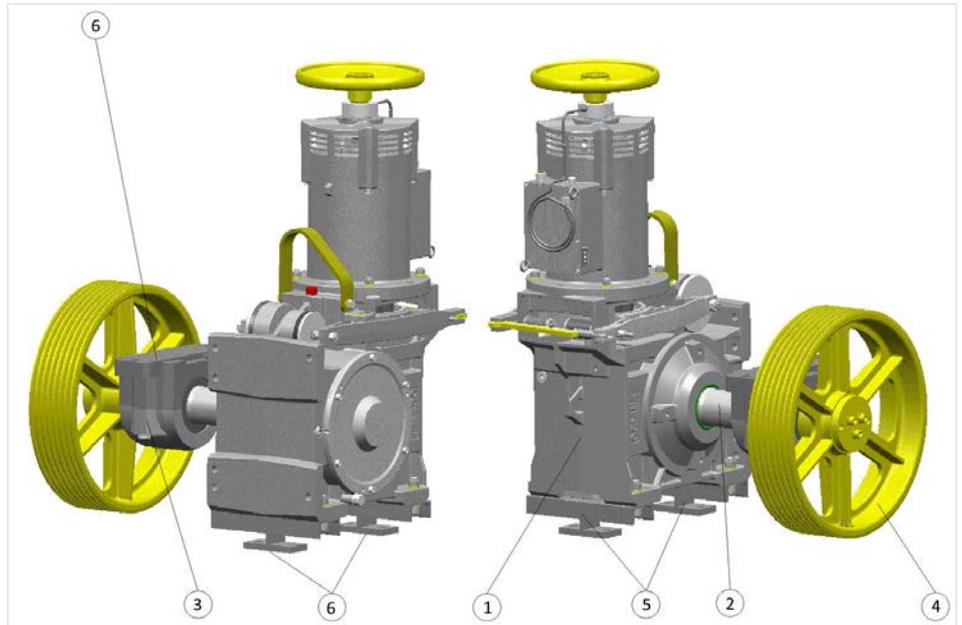


Fig. 4

ATR_2_12_0110_0

Item	Designation	Item	Designation
1	TW130 SA9 machine	2	Traction sheave shaft, SA9 version
3	Outside bearing (bearing housing with self-aligning bearing on adapter sleeve)	4	Traction sheave, SA9 version
5	Compensating support (for statically defined machine mounting)	6	Mounting surfaces for machine base frame

Version for position of traction sheave in the shaft – SA9 in combination with emergency brake – NBS

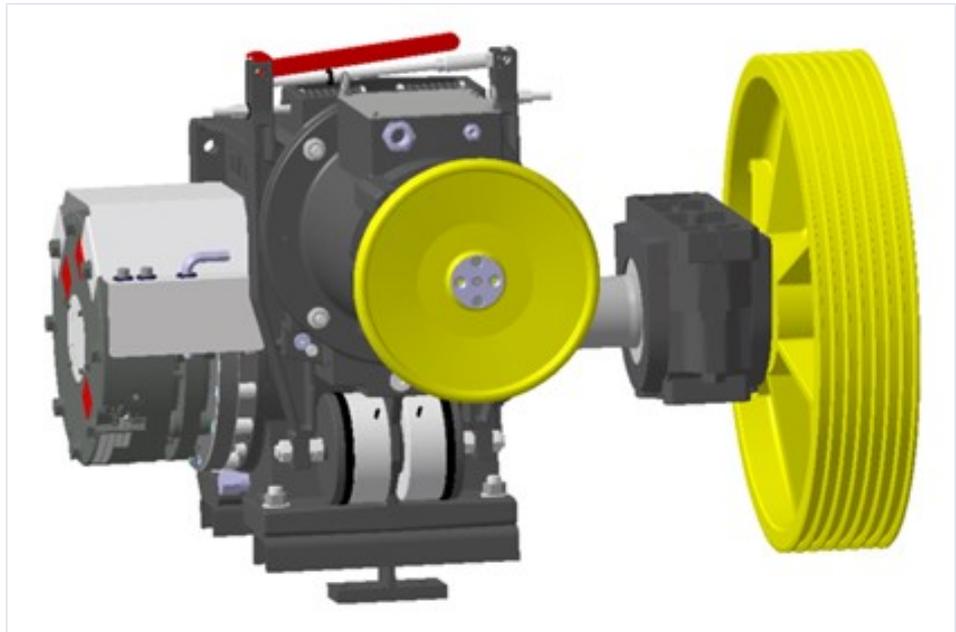


Fig. 5

ATR_2_21_0177_0

Special version SA1 (reinforced mounting of the machine, including compensation washers)

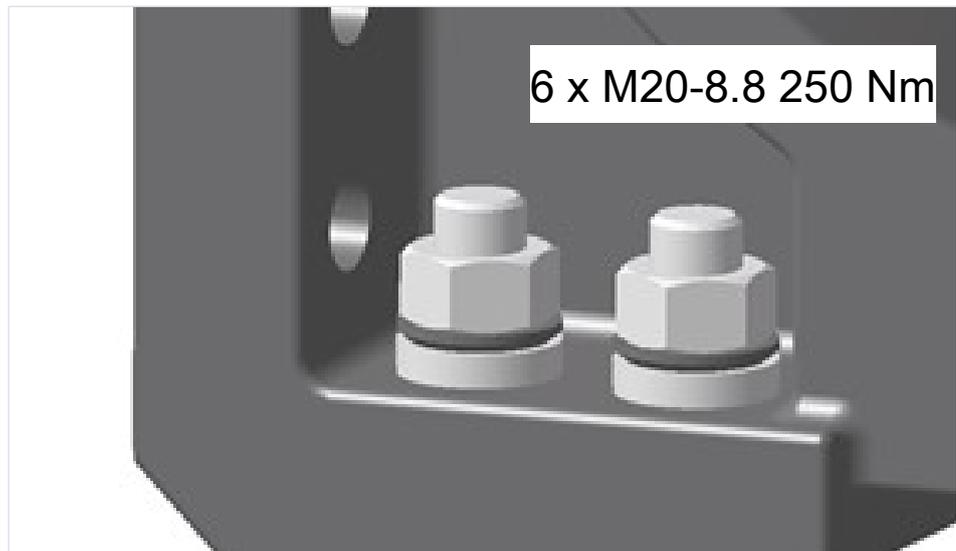


Fig. 6

ATR_2_21_0180_0

Special versions SA3.1/SA15

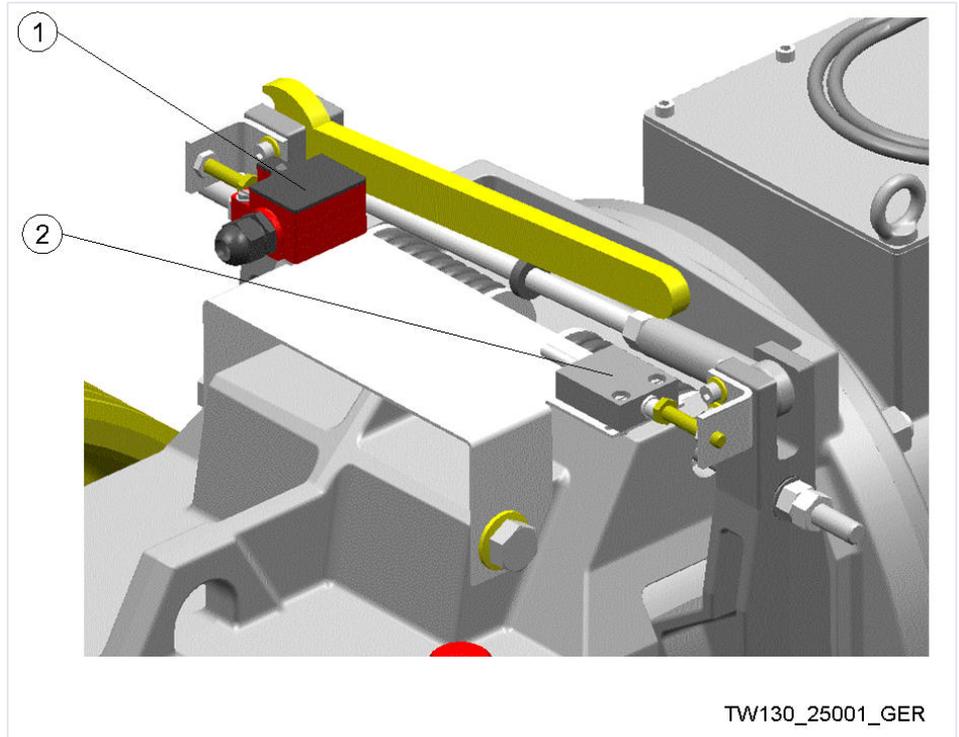


Fig. 7

ATR_2_12_0112_0

Item	Designation	Item	Designation
1	SA 3.1 brake monitoring	2	Brake monitoring for SA15

Version with safeguard measures in accordance with EN81-77

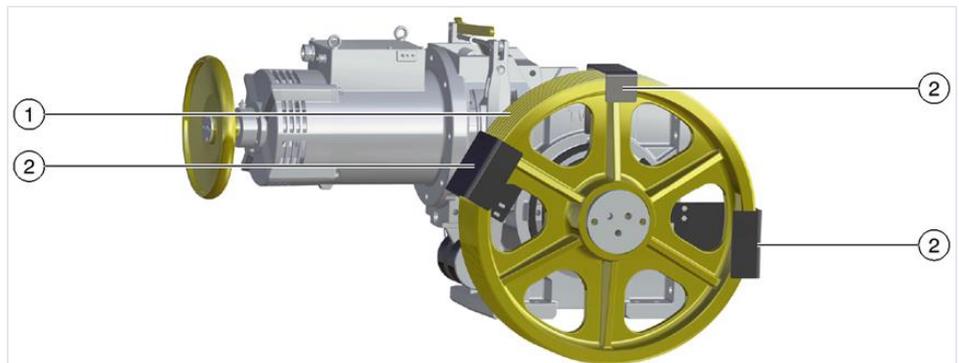


Fig. 8

ATR_2_12_0113_0

Item	Designation	Item	Designation
1	Traction sheave (D540/D640/D720)	2	Earthquake safeguard in accordance with EN81-77

3.3.1

Machine base frame

Various machine base frame versions are possible. Consult the general arrangement drawings.

The machine base frames with / without rope pulley described below are intended for installation of the machine in the machine room above the shaft.

TW130 O SR machine base frame AY

Machine base frame version without rope pulley for use in:

- Installations with 1:1 rope suspension and direct rope departure for an elevator car – counterweight rope distance ASL diameter (DT + 100) mm depending on the traction sheave diameter.
- Installations with 2:1 or 4:1 rope suspension.
- Weight of the machine base frame: Approx. 135 kg

The machine base frame consists of three plated-edge longitudinal brackets with two cross-sections welded at the ends incl. supporting surfaces for the insulation elements.

The hole pattern in the machine base frame is designed for all versions of the machine (vertical/horizontal motor position, traction sheave position left/right) and for the use of standardised traction sheaves with diameters 540 mm, 640 mm and 720 mm.

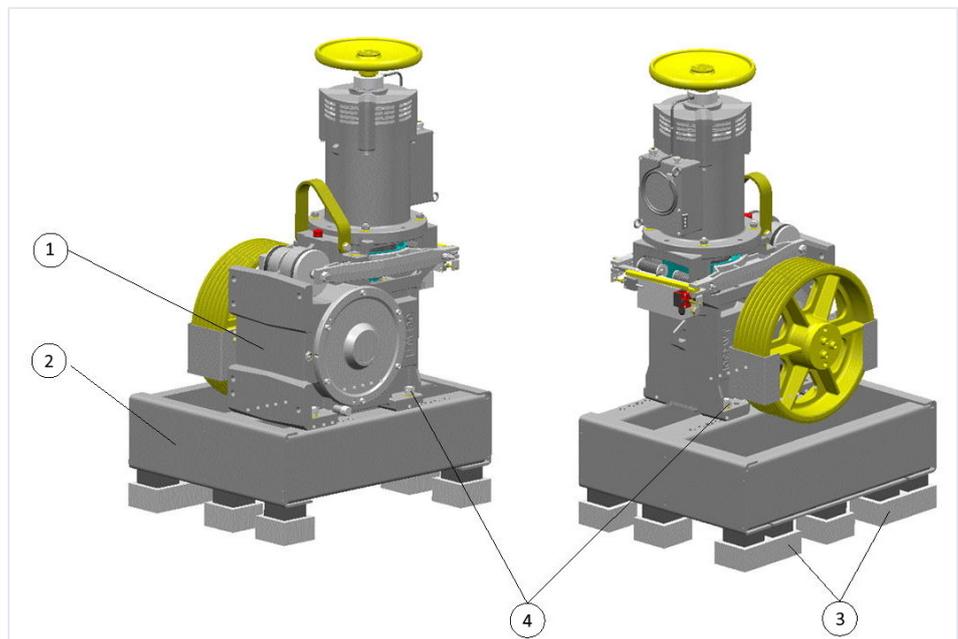


Fig. 9

ATR_2_21_0114_0

Item	Designation	Item	Designation
1	TW130 machine	2	TW130 O SR machine base frame
3	Insulation elements	4	Mounting parts for machine/ base frame

TW130 M SR machine base frame AY

Machine base frame in version with rope pulley depending on the pulley hub position in left-hand or right-hand configuration for use with:

Installations with 1:1 rope suspension and elevator car – counterweight rope distance ASL with approx. 700 to 1300 mm diameter in conjunction with the standardised traction sheaves diameter 540 and 640 mm. Depending on the vertical/horizontal motor position, the traction sheave position left/right and the traction sheave diameter DT configurations, there are different values for the ASL dimension that can be set on the machine base frame.

The versions with D450 and D540 (for rope pulleys, see factory standard 6072012000) are used for the rope pulley. The rope pulleys have maintenance-free roller bearings.

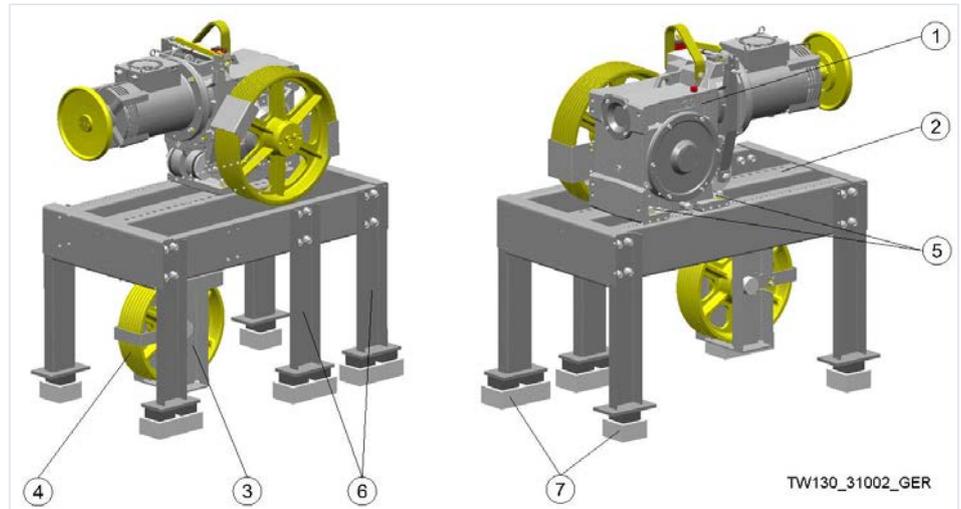


Fig. 10

ATR_2_21_0115_0

Item	Designation	Item	Designation
1	TW130 machine	2	Upper section, machine base frame
3	Pedestal bearing for rope pulley	4	Rope pulley
5	Mounting parts for machine/base frame	6	Supports for insulation elements
7	Insulation elements		

The complete machine base frame comprises the following components:

- Machine base frame upper section consisting of three plated-edge longitudinal brackets with two cross-sections welded at the ends.
- Pedestal bearing (bolted) for the rope pulley holder with axle; version based on the rope pulley used
- D450-7x diameter 10 rope pulley (with groove clearance RA = 18 or 20 mm in polyamide version), D450-7/8 x diameter 10/11 (all other groove diameters and groove clearances in version made of EN-GJL 250), D540-7 x diameter 12/13 (in general all versions made of EN-GJL 250)
- Supports (4/5 units, screw-connected) for mounting the insulation elements.

The hole pattern in the machine base frame is designed for all versions of the machine (vertical/horizontal motor position, traction sheave position left/right) and for the use of standardised traction sheaves with diameters 540/640 mm.

It is possible through appropriate mounting of the pedestal bearing with rope pulley and the screw-connected supports to position the pulley hub on the right or left in the machine base frame.

Rope pulley version [mm] (material of the rope pulley)	Weight, including rope pulley [kg]
D450 (polyamide)	315
D450 (EN-GJL 250)	365
D540 (EN-GJL 250)	380

BT base frame-mounted machine

A set of screw connection elements (4 x M20-8.8) is available for mounting the TW130 machine and standardised TW130 machine base frame with/without rope pulley machine, including outside bearing.

A reinforced mounting (SA1 6 x M20-8.8 250) is required for individual applications of the TW130 machine with upward horizontal or vertical rope departure – except for the special versions SA4/9.

Instructions for setting up machine base frames in the machine room

The machine base frames are erected using impact soundproof elements (rubber block 100 x 100/50 mm high) in the machine room.

- Insulation elements without packing for machine room without floor pavement and/or erection of machine base frame directly on floor pavement
- Insulation elements with packing for machine room with floor pavement (≤ 60 mm high); support made from Multiplex laminated wood 140 x 140/80 mm high

Version with earthquake safeguard in accordance with EN81-77

Optional components are available for the TW130 O SR and TW130 M SR base frames; these meet the requirements for protection devices complying with EN81-77.

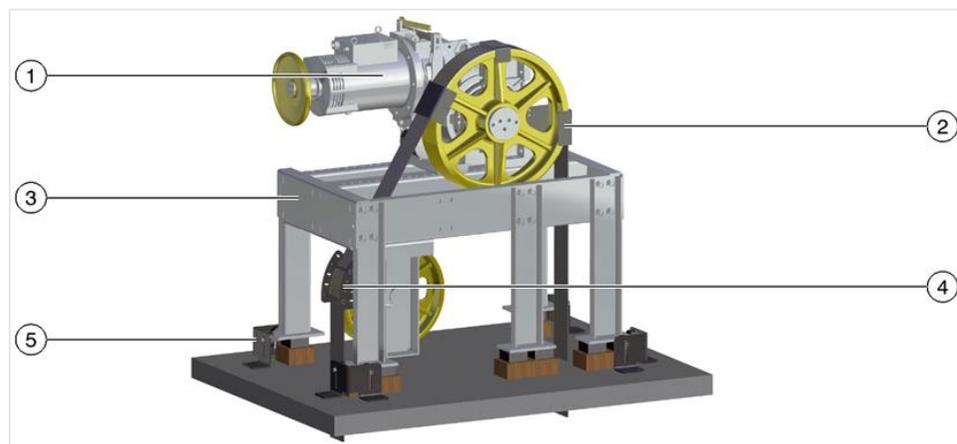


Fig. 11

ATR_2_12_0116_0

Item	Designation	Item	Designation
1	TW130 machine	2	Rope guard in accordance with EN81-77 for traction sheave

Item	Designation	Item	Designation
3	TW130 M SR machine base frame	4	Rope guard in accordance with EN81-77 for rope pulley diameter D450, D540
5	Shift protection device in accordance with EN81-77		

The safeguard measures are only suitable for machine base frames with locations in the machine room. The protection device consists of a modified rope guard for rope pulleys of diameter D450 or D540 which prevent the ropes from departing from the grooves.

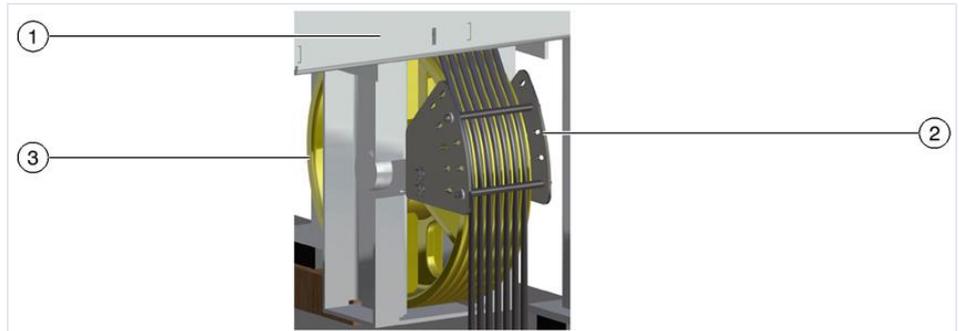


Fig. 12

ATR_2_12_0117_0

Item	Designation	Item	Designation
1	TW130 M SR machine base frame	2	Rope guard in accordance with EN81-77 for rope pulley diameter D450, D540
3	Rope pulley diameter D540		

The safeguard measures also consist of shift protection devices that prevent the machine from changing its position.

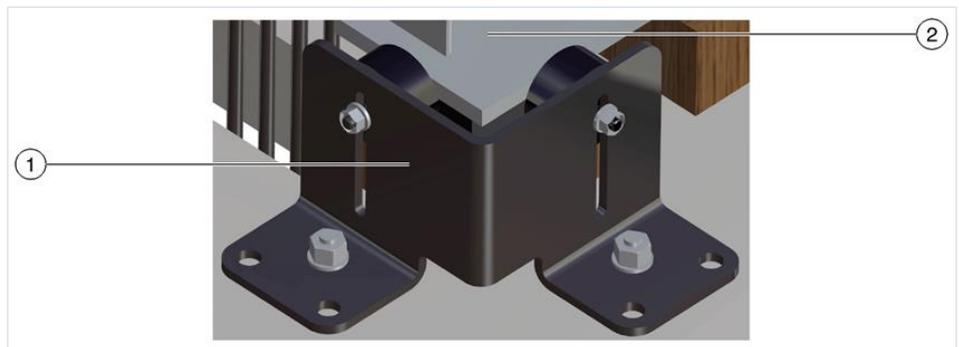


Fig. 13

ATR_2_12_0118_0

Item	Designation	Item	Designation
1	Shift protection device in accordance with EN81-77	2	TW130 M SR machine base frame

In the case of deployment of the machine in earthquake categories 2 and 3, additional safeguard measures in accordance with EN81-77 are necessary.

3.3.2

Standard version for machine in the machine room

The standard version of the machine TW130 comprises the following components:

- Driving gear (incl. oil filling; vertical/horizontal motor position; traction sheave position – left/right)
- Service brake (2 x 125 Nm or 2 x 200 Nm); for deployment complying with EN81-20/50, including brake monitoring SA3.1
- Motor type IMB5/V1
- Flexible coupling between motor and driving gear
- Encoder and handwinding wheel
- Traction sheave (standard version)
- Rope guard components
- Blocking clamp

3.3.3

Special versions

- SA 1 Reinforced machine mounting (including compensating sheave) pointing upwards horizontally or vertically as a result of the rope pull direction.
- SA3.1 Brake monitoring (microswitch).
- SA 9 Traction sheave position in the shaft (extended traction sheave shaft with pedestal bearing and machine on compensating supports for statically defined mounting/mounting of the drive shaft).
- SA15 "Full Ex" protection (including microswitch for brake monitoring).

Brake monitoring (special version SA3.1 / SA15)

For monitoring the service brake (function and wear), it is possible to configure the machine with optional brake test switches (version with microswitch - SA3.1) (one switch for each brake circuit).



Brake monitoring is generally to be provided in order to use the machine in combination with TKE frequency inverters of type RPI/MFR. Brake monitoring SA3.1 (microswitch) is generally to be provided in order to use the machine complying with EN81-20/50. Exception: In the case of Full Ex machines, this is already a constituent part of SA15.

Description	Unit	Technical data	
Version		Standard SA3.1	Full Ex (SA15)
Manufacturer		Bernstein	Steute
Switching principle		Switch with contacts (1 break contact / 1 make contact)	
Switching display		-	-
Operating voltage	[V]	240 (AC) / 24 (DC)	250 (AC)
Max. switching current	[A]	3	6
Type of protection		IP65	IP67
Explosion protection		-	EX II 2G Ex db IIC T6, T5 Gb
			EX II 2D Ex tb IIIC T80°C, T95°C Db

Description	Unit	Technical data	
Type approval certificate		-	PTB 03 ATEX 1070 X
Cable entry point		Cable gland M16 x 1.5	Cast connection line 4 x 0.75 mm ² 5 m length

Tab. 2

ATR_1_21_0038_0

Traction sheave position in the shaft (SA9)

For this version, the machine has an extended traction sheave shaft with an outside bearing and two compensating supports underneath the machine for statically defined mounting. The outside bearing is mounted in a position to suit the rope pull direction (normally in the upward direction).

This version is standardised for traction sheaves with diameters DT = 540, 640 and 720 mm.

The components for the rope guard are not an integral part of the machine in this version. Note on the machine base frame (not standardised): The permitted tolerance for the horizontal offset between the plane for the compensating supports and the mounting surface for the outside bearing is ± 1 mm.

"Full Ex" protection (special version SA15)

The "Full Ex" machine version is used in installations in which the entire machine room is located in the potentially explosive atmosphere.

The machine (not including the electrical components) has been assessed for potential ignition sources in accordance with DIN EN ISO 80079:-36 and complies with the requirements of Directive 2014/34 EU. The machine (not including the electrical components) is assigned the following identification in accordance with Directive 2014/34/EC:

Ex groups IIC-IIIC for layer thickness ≤ 0.2 mm (standard version):

- Ex II 2 G Ex h IIC T4 Gb
- Ex II 2 D Ex h IIIC T135°C Db

Ex groups IIB-IIIB for layer thickness > 0.2 mm / ≤ 2 mm:

- Ex II 2 G Ex h IIB T4 Gb
- Ex II 2 D Ex h IIIB T135°C Db

(Equipment group: II = other than mining; category: 2 = Zone 1, 21; Ex atmosphere: G = Gases and D = Dust; Ignition protection type: h (c = constructional safety and k = liquid encapsulation); area with danger of gas explosions: Ex groups IIB or IIC; area with danger of dust explosions: Ex groups IIIB or IIIC; temperature class: T4 and/or max. 135°C)

- The maximum permitted angle of inclination of the machine in relation to the horizontal is 2° to ensure the type of ignition protection "k" in compliance with DIN EN ISO 80079-37.
- In the case of special paintwork for increased corrosion protection, e.g. C5-M with layer thickness ≥ 0.24 mm, only a rating according to IIB and/or IIIB is possible!

- The maximum permitted rope speed at the traction sheave is limited to 3.2 m/s. Related to the rated speed, this means a maximum of 3.2 m/s with 1:1, a maximum of 1.6 m/s with 2:1 and a maximum of 0.8 m/s with 4:1.

The service brake is generally monitored by brake test switches.

Layout of electrical components:

- Brake magnets in Ex data [↗ Chap. 4.1.2 P. 29](#).
- Brake test switch in Ex [↗ Chap. 3.3.3 P. 24](#) (Note: These brake test switches are general constituent parts of SA15).
- The motor and any encoders as well as an additional terminal box for the magnetic clamps depend on the project specs.

3.3.4

Version with emergency brake, NBS

The optional version of the emergency brake (NBS) meets the requirements for the protection device that prevents overspeed in the upward-moving elevator car in accordance with EN81-1:1998 / 9.10 and/or EN81-20/5.6.6 and unintended elevator car movements in accordance with EN81-1:2010-06 / 9.11 (EN81-1/A3) and/or EN81-20/5.6.7.

Alongside the service brake, an additional braking device is fitted on the drive shaft, consisting of the components:

- Type-approved electromagnetic disc brake in accordance with [↗ Chap. 4.1.6 P. 34](#)
- Driving gear in emergency brake NBS version (bearing bracket NBS, brake flange NBS for fitting the brake)
- Traction sheave / worm wheel shaft NBS (including components for sealing)

The braking device is located on the machine side opposite the traction sheave and directly affects the traction sheave shaft.

A certificate with respect to the calculation of the traction sheave shaft for the machine TW130 with emergency brake system (NBS) shall be enclosed with the technical documentation.

The emergency brake is activated via a separate control unit including terminal box and connecting lines as well as an additional safety switch at the overspeed governor (made by TK Elevator) to activate the facility in the event of overspeed.

The emergency brake is released manually (e.g. emergency rescue in the event of a power failure) via screws that are screwed into the brake in the event of triggering, thus releasing the brake/armature base plate of the disc brake. During normal operation, the screws and a socket wrench are kept in the guard plate of the brake.

For installation of the manual emergency ventilation screws, a minimum distance of 100 mm is to be set between the emergency brake and the adjoining wall of the machine room or similar.

Retrofitting of the emergency brake, NBS, on existing machines TW130 is not possible.

3.3.5

Version with earthquake safeguard complying with EN81-77

The optional version of the rope guard complying with EN81-77 enables compliance with the requirements for protection devices in earthquake regions up to earthquake category 1 as standard.

The rope guard fitted as standard is replaced with the modified rope guard which, in the event of an earthquake, prevents the ropes from leaving the groove of the traction sheave. Attention should be paid to ensuring that the rope guard is installed in accordance with the installation instructions.

The rope guard complying with EN81-77 is standardised for the traction sheave diameters 450 / 640 / 720. The rope guard is designed in such a way that all standard gaps between the ropes on the rope departure can be covered with the TW130 O SR and TW130 M SR base frames.

3.4

Combination of versions / options

Combination	SA1	SA3.1	SA9	SA15	2x125	2x200	540/640/720	NBS	horizontal	vertical	EN81-77
SA1											
SA3.1	X										
SA9	O	X									
SA15	X	O	X								
2x125	X	X	X	X							
2x200	X	X	X	X	O						
540/640/720	X	X	X	X	X	X					
NBS	X	X	X	O	X	X	X				
Horizontal	X	X	X	X	X	X	X	X			
Vertical	X	X	X	X	X	X	X	X	O		
EN81-77	O	X	O	X	X	X	X	X	X	X	

X Combination possible

O Combination not possible

540, 640, 720 traction sheave diameter [mm]

SA... special versions

V Motor position - vertical

H Motor position - horizontal

NBS Version with emergency brake-NBS

EN81-77 earthquake safeguard complying with EN81-77

4 Technology

4.1 Mechanical data

4.1.1 Gear unit

Single-stage worm gear with:

- Monoblock housing made of EN-GJL 250 with integrated AS bearing bracket and separate BS bearing bracket; separate versions of the housing for traction sheave position – left /right; vertical/horizontal motor position possible; motor flange (construction size A400) integrated
- Traction sheave shaft made from tempering steel (C60 or 42CrMo4+QT for emergency brake system and Mayr RSO1300/4000 Nm brake), roller bearing (oil lubrication); drive shaft in extended version for traction sheave in shaft (SA9) incl. outside bearing possible
- With vertical motor position, gear teeth partially submerged in oil; with horizontal motor position, with oil delivered from oil sump via worm wheel gear teeth; adjustable gear teeth contact pattern position; backlash cannot be adjusted
- Oil level monitoring via gauge glass; oil drain (R3/4"); casing ventilation; installation in accordance with vertical/horizontal motor position
- Worm shaft made of case-hardened steel (16MnCrS5), roller bearings (grease/oil lubrication); worm wheel made of centrifugally case bronze (CuSn12Ni-C-GZ) with screw-connected hub
- Machine type plate

Version	Unit	TW130
Axle distance	[mm]	191
Ratio		52:1/42:1/35:1/45:2/43:3
Oil filling (motor position)	[L]	approx. horizontal 20.0/vertical 25.0
Oil grade		Synthetic gear oil (polyalkylene glycol with additives)
Designation		SM1
Backlash	[°]	0.02-0.06
Weight	[kg]	-

Tab. 3

ATR_1_21_0005_0

The rope guard components are adjustable for rope departure directions of the relevant rope line up to 90° upwards and 45° downwards in relation to the vertical tangent. For the version with the traction sheave in the shaft (SA9) or in the case of rope departure directions outside the adjustable range, installation-specific rope guard measures must be taken in accordance with EN81-1 / 9.7EN81-20/5.5.7 EN81-77.

4.1.2

Brake

Redundant electromagnetic dual-circuit outside shoe brake on the motor/ worm shaft integrated in the gear or motor flange. The electric release of the brake circuits takes place via magnetic clamps. The magnetic clamps are available in standard and in explosion-proof versions.

A flexible coupling must be integrated on the brake disc to connect the motor and worm shafts.

Depending on the installation data, two different versions of the service brake are used.

Designation	Unit	Technical data			
Manufacturer		TK Aufzugswerke GmbH			
Type		TW130			
Braking torque	[Nm]	Max. 2 x 125		Max. 2 x 200	
Braking torque adjustment		Possible			
Design		Two-circuit outside brake shoe with brake disc made of EN-GJL 250			
Brake linings		Made without asbestos			
Brake disc diameter	[mm]	265			
Air gap	[mm]	0.3			
Air gap setting		Possible			
Electrical release		1 magnetic clamp per brake circuit (2 magnetic clamps in series connection)			
Nominal force – magnetic clamps	[N]	2500		5000	
Operating voltage ¹⁾	[VDC]	180 – overexcitation			
		90 – holding voltage			
Rated current ¹⁾	[A]	1.1/1.0 ³⁾		1.8/1.79 ³⁾	
S5 – operation data		40% ED/240 c/h 60% ED/180 c/h			
Monitoring devices		Brake test switch (optional)			
Manual release		Brake release lever (mounted)			
Protection type, magnetic clamps		IP65 (standard version)			
		II 2 G Ex mb IIC T4 Gb ³⁾			
		II 2 D Ex mb IIIC T105°C Db ³⁾			
Type approval sign		Not on standard version			
		IBExU17ATEX1137 X ³⁾			
Length of connection cable	[m]	1.5	1.5 ³⁾	1.5	1.5 ³⁾

Tab. 4

ATR_1_21_0041_0

¹⁾ Details for magnetic clamps in series connection.

³⁾ Version for explosion protection.

Version with NBS emergency brake

Designation	Unit	Technical data
Manufacturer		Chr. Mayr GmbH
Type		Mayr RSO1300/4000 Nm
Braking torque	[Nm]	4000
Braking torque setting		not possible
Design		4-surface disc brake
Version of brake linings		Asbestos-free
Brake disc diameter	[mm]	283.5
Air gap	[mm]	0.65 - 0.1/+ 0.15
Air gap setting		not possible
Electrical release		1 magnetic clamp with armature base plate
Operating voltage	[VDC]	207 - overexcitation
		104 - holding voltage
Operating current	[A]	2.96 - over-excitation
		1.49 - holding current
Performance data	[W]	613 - over-excitation
		155 - stopping power
Monitoring devices		Release monitoring (microswitch)
Manual emergency release		2 x M16 screws
Connection cable length	[m]	approx. 1.0
Type of protection		IP54
Weight	[kg]	approx. 107
Type approval sign		EU-BD 891 ²⁾ and/or ABV 891 ³⁾
Type approval sign		EU-BD 891 ²⁾ and/or ESV 891 ³⁾
Times: t10 / t50 / t90 ¹⁾	[ms]	115/190/300
Certificate for traction sheave shaft		TW130-RSO1300/4000 Nm
Test number		

Tab. 5

ATR_1_21_0055_0

¹⁾ DC - direct current cut-off (emergency stop)²⁾ Complying with EN81-20/50 and EN81-2:1998+A3:2009³⁾ Complying with EN81-1:1998+A3:2009

4.1.3

Encoder

The following hollow shaft encoders are available:

Number of pulses	Version	Connection
2x1024	TTL	Line and connector hard-wired
2x4096	TTL	Line and connector hard-wired

Tab. 6

ATR_1_21_0072_0

4.1.4

Traction sheave

Different versions of traction sheave are used, depending on the location of the machine.

- Standard version – traction sheave position in the machine room
- Special version SA9: Traction sheave position in the shaft

The traction sheaves for the standard versions differ from the SA9 versions in the dimensional assignment of traction sheave middle to cone position. The use of SA9 versions in machines for the machine room - and vice versa - is not possible.

The one-part traction sheaves are secured overhung on the traction sheave shaft using a cone (1:15) and a mounting plate, including three screws (M16-8.8 microencapsulated with locking washer).

Designation	Unit	Technical data		
Machine version		Standard		
		SA9		
Diameter – DT	[mm]	540	640	720
Rim width – B	[mm]	150		
Max. possible number of grooves – z x d ²⁾		12 x 8 (11 x 8)		
		10 x 9		
		9 x 10 / 8 x 11		
		8 x 12 (7 x 12)		
		7 x 13		
		7 x 1/2"		
		-	7 x 14 ¹⁾ (6 x 14)	
		-	6 x 15	
		-	6 x 16 (5 x 16)	
-	5 x 5/8"			
Groove type		Seat/vee groove ¹⁾		
Vee groove angle	[°]	Depends on project specs ¹⁾		
Weight	[kg]	75	90	140
Material		Specially alloyed EN-GJL 250 / EN-GJL-300		

Tab. 7

ATR_1.21.0013_0

¹⁾ Version in accordance with the product description, groove profiles with hardened groove flanks (min. 50 HRc).

²⁾ With minimum groove clearance – R_{Amin} – in accordance with the product description for groove profiles for seat grooves (for vee groove, if deviating)

4.1.5

Performance chart

Applications in the standard

r	v _n	n ₁	DT	i	v _{n1}	Q' _{max}	F' _{max}	x%
1:1	0.63	1160	540	52:1	0.63	1725	2500	45
		1250				1600	2000	50
						0.68	1600	2500

r	v _n	n ₁	DT	i	v _{n1}	Q' max	F' max	x%
2:1	0.80	1240	640		0.80	1350		
		1470				1450		
	1.00	1240	540	35:1	1.00	1800	2200	50
						1600	2500	
		1115	720	42:1		1250	2000	45
		1250	640			1425		
		1490	540			1350		
				1500	2500			
	1.25	1310	640	35:1	1.25	1350	2200	50
		1550	540			1500		
	1.50	1570	640		1.50	1275	1800	
						1200	2200	
	1.60	1270	540	45:2	1.60	1500	2500	45
		1485	720	35:1		1125	1750	
		1670	640			1125	2200	
						1250	1500	
	1.75	1175	640	45:2	1.75	1350	2000	
						1250	2500	
		1390	540			1400	2500	
				1500	2000			
	2.00	1015	540	43:3	2.00	1450	2200	45
		1200	720	45:2		1125	2000	
		1340	640			1200		
		1590	540			1350		
			1250	2500				
2.50	1070	640	43:3	2.50	1200	2300		
	1270	540			1350			
	1490	720	45:2		1275	2600		
	1680	640			1050	1500		
			1050	1800				
3.00	1280	640	43:3	3.00	1050	2200		
	1520	540			1200			
0.50	0.50	1115	720	42:1	0.50	2500	3500	50
		1240	540	35:1		3400	4000	45
						3750		
		1250	640	42:1		2700	3500	50
				3000	45			
	0.63	1320	540	35:1	0.63	2750	3200	50
		1560				3000	3500	45
					3200	50		

r	v _n	n ₁	DT	i	v _{n1}	Q' max	F' max	x%		
4:1	0.80	1270		45:2	0.80	3250	4000	45		
						3000		50		
		3350	45							
		2350	3000	50						
	1670	640	35:1			2600	3400	45		
	1.00	1200	720		45:2	1.00	2250	3000	50	
							2400		45	
		1340	640					2650	3500	45
								2550	4000	50
	1590	540				2800				
	1.25	1270			43:3	1.25	3000	3200	45	
		1680	640				2300	3000		
	1.50	1280					540			
		1520	2600							
	1.6	1220	720		43:3	1.60	2000	3200		
		1370	640				2300			
1620		540	2500							
1.75	1500	640			1.75	2200	3000			
2.00	1520	720			2.00	1750				
	1710	640				2000				
4:1	0.40	1270	540	45:2	0.40	6000	7000	50		
		1670	640	35:1		4700				
	0.50	1200	720			0.50	4500			6000
		1340	640				45:2			
	1590	540					5400			5000
							1280			
	1690	640					4300			5000
							1370			43:3
	1620	540	4650	6000						
	1520	720				1.00	3500		4500	
							1710			640

Tab. 8

ATR_1_21_0062_0

r - Rope suspension
v_n fpm (m/s) rated speed
n₁ (rpm) Motor speed
DT in (mm) Diameter of traction sheave
i - Gear ratio
Q' max lbs (kg) Rated load (maximum)
F' max lbs (kg) Mass of car (maximum at Q' max)
x (%) Counterweight compensation

Performance data, including suspension rope weight MSR for travel height:

- H = 20 m for v_n to 0.63 m/s
- H = 40 m for v_n to 1.25 m/s

- $H = 100$ m for v_n to 2.50 m/s

as well from $v_n = 1.6$ m/s suspension rope compensation MCR (counter ropes etc.)

All specified performance data in [Chap. 4.1.5 P. 31](#) apply to the following application conditions:

- Operating data max. 180 c/h at 50% duty cycle
- Ambient temperature + 5°C to + 40°C

For types of performance not shown in the chart or deviating installation data, there is the possibility to use a calculation program (e.g. TK Liftdesigner) to check the operational safety of the machine.

The machines are conceived for a service life of at least 15 years and/or 20,000 hours of operation.

The maximum permitted rope speed at the traction sheave is limited to 3.2 m/s for versions with EX protection (SA15).

Related to the rated speed, this means a maximum of 3.2 m/s with 1:1, a maximum of 1.6 m/s with 2:1 and a maximum of 0.8 m/s with 4:1.

4.1.6

Motor versions

Frequency-controlled three-phase motors of the IMB5/V1 type are used as standard.

The motor shaft/worm shaft connection is provided by a flexible coupling (make: Centaflex A size 50).

All motors provide the option of intermediate clamping for the magnetic clamps in the motor terminal box.

Designation	Unit	Technical data		
Version		Frequency-controlled (frequency inverter)		
Make		Orange1	Motorlift	EMOD
Type		DTE132 – DTL180	CMRF160	BG 180L/4 BG 180L/4a BG 225SM/4
Voltage/frequency		1)		
S5 – operation data		240 c/h/50% ED		
Speed range	[rpm]	1250–1650	1000–1650	1250–1650
Nominal power	[kW]	11–42	10.5–13	18.5–31.5
Design		IMB5/V1		
Type of protection		IP21	IP54	IP55
Ventilation		Internal ventilator ²⁾		
Handwinding wheel	[mm]	D270 ³⁾ /360 (plastic)	D270 (plastic)	D360 (plastic)

Designation	Unit	Technical data
kproj.	[mm]	¹⁾
Actual-value sensor		WDG100-38-1024/4096 TTL

Tab. 9

ATR_1.21_0054_0

¹⁾ [Product catalogue for elevator motors](#)

²⁾ Type DTL180 with forced ventilation

³⁾ Only with type DTE132

The specified electrical data applies to the following site conditions:

- Max. altitude 1000 m amsl
- Max. temperature + 40 °C at max. 50% air humidity
- Max. relative air humidity 70% at 20 °C

If the conditions stated above are exceeded, the deratings in accordance with VDE0530 apply.

Please refer to the product catalogue [Product catalogue for elevator motors](#) for detailed technical data for the motors and encoders.

The encoders include a 10 m long connection cable, including connector (types 1024/4096 TTL) for connection to TKE frequency inverters.

Special motors

For areas of application in which a standard version motor cannot be used, a custom-order type IMB5/motor is used, e.g.:

- Special motors for e.g. explosion-proof versions or special customer-requested motors, etc.
- The mechanical layout (flange dimensions, AS/BS shaft ends, encoder, handwinding wheel, etc.) is executed in accordance with building code BV 6530-05 / Pages 3-7.
- In the case of Ex motors, if required, a suitable terminal box for the magnetic clamps is to be provided depending on the order.

4.1.7

Load data - traction sheave shaft

The load value F_{tzu} listed below is the limit value of the permitted radial stress for the traction sheave shaft calculated from the overall mass present on the installation.

The overall mass of the installation is determined and the load is checked as part of the calculation program TK LiftDesigner.

- Traction sheave shaft - standard version: $F_{tzu} \leq 77$ kN
- Traction sheave shaft - emergency brake, NBS $F_{tzu} \leq 70$ kN
- Traction sheave shaft - SA4/9 (with outside bearing): $F_{tzu} \leq 60$ kN
- Traction sheave shaft SA4/9 + NBS: $F_{tzu} \leq 65$ kN

4.1.8

Load data for rope pull direction – vertical upwards or horizontal

For the configuration of the machine with the standard version of the traction sheave shaft or in the version for the emergency brake system, NBS, there are restrictions due to the housing strength for the permitted load $F_{t_{zul-stat}}$ depending on the installation data for the upward horizontal or vertical rope pull direction.

TW130 with vertical motor position

- Horizontal rope pull: $F_{t_{zul-stat}} = 152 \text{ kN} \leq F_{t_{stat-max}}$
- Upward vertical rope pull: $F_{t_{zul-stat}} = 126 \text{ kN} \leq F_{t_{stat-max}}$

TW130 with motor position – horizontal

- Horizontal rope pull: $F_{t_{zul-stat}} = 124 \text{ kN} \leq F_{t_{stat-max}}$
- Upward vertical rope pull: $F_{t_{zul-stat}} = 103 \text{ kN} \leq F_{t_{stat-max}}$

The load $F_{t_{stat-max}}$ present for the static overload case is determined via the TK-LiftDesigner, etc.

The values for upward horizontal and/or vertical rope pull directions can be used up to $\pm 45^\circ$ respectively for rope pull directions between upward horizontal and vertical.

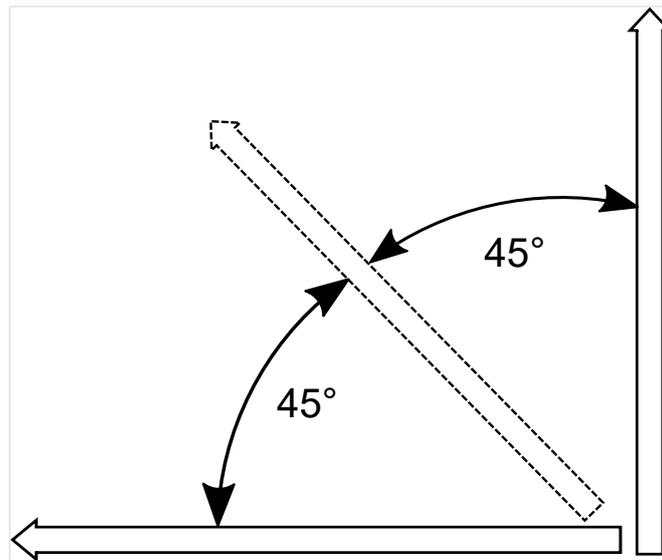


Fig. 14

ATR_2_12_0168_0

For installations on which $F_{t_{stat-max}} > F_{t_{zul-stat}}$ the permitted load and possible constructive measures must be clarified with TK Aufzugswerke GmbH on request.

With the special version SA9 and horizontal rope tension ($\pm 45^\circ$), the outside bearing must be turned in the load direction. The intended machine base frame must be appropriately dimensioned and prepared to accommodate the outside bearing so that the occurring forces can be absorbed.

Additional struts must be provided at the feet of the gear box housing in order to relieve the supports under the housing and their screwed connection.

With the special version SA9 and vertical rope tension upwards (+/- 45°), the outside bearing must be turned in the load direction. The intended machine base frame must be appropriately dimensioned and prepared to accommodate the outside bearing so that the occurring forces can be absorbed.

4.1.9 Gear efficiency

The specified gear efficiencies η_G and η_G' are extreme values which are to be applied for dimensioning the motor, frequency inverter and braking resistor, etc. The rated efficiency η_n provides information on the value η_G that can be achieved under optimum operating conditions.

The efficiencies η_{an} and η_{an}' describe the state of gear starting (overcoming static friction or build-up of lubricating film in the gear teeth; with η_{an} values < 0.5 - the gear, when stopped, must be viewed as self-inhibiting).

- η_G : minimum design efficiency, driving
- η_G' : maximum design efficiency, driven (braking)
- η_n : rated efficiency - driving
- η_{an} : starting efficiency – driving
- η_{an}' : starting efficiency – driven

Ratio / Speed [rpm]	η_G		η_G'		η_n	η_{an}	η_{an}'
	800 - 1249	1250 -1800	800 - 1249	1250 -1800	1250 -1800	-	-
52:1	0.68	0.70	0.70	0.72	0.78	0.38	-0.17
42:1	0.72	0.74	0.76	0.78	0.82	0.44	0.11
35:1	0.74	0.76	0.79	0.81	0.84	0.45	0.13
45:2	0.79	0.81	0.86	0.88	0.89	0.57	0.48
43:3	0.81	0.83	0.89	0.91	0.92	0.65	0.65

Tab. 10

ATR_1_21_0064_0

4.1.10 Mass moment of inertia

The value for the mass moment of inertia includes the driving gear with brake disc and coupling element as well as a proportion for the traction sheave.

- Mass moment of inertia: $J_{rot} = 0.14 \text{ kgm}^2$

Not included are the mass moments of inertia for the motor with handwinding wheel.

The values for the mass moment of inertia of non-standardised motors can be found in the lists of motors (e.g. Koncar, etc.).

4.1.11 Weight

Designation	Weight [kg]	Machine version without motor				Machine version with motor DTE140 ²⁾			
Assembly, winch TW130 ¹⁾	350	x	x	x	x	x	x	x	x
Additional parts for SA9	60		x		x		x		x
Additional parts for NBS emergency brake system	130			x	x			x	x
Traction sheave D640 ²⁾	90	x	x	x	x	x	x	x	x

Designation	Weight [kg]	Machine version without motor				Machine version with motor DTE140 ²⁾			
DTE140 motor ³⁾	120					x	x	x	x
ASY complete machine [kg]		440	500	570	630	560	620	690	750

Tab. 11

ATR_1_21_0009_0

¹⁾ without motor.²⁾ Weight for traction sheave D540 approx. 75 kg / D720 approx. 140 kg³⁾ Weight for other motor versions [↗ Chap. 4.1.6 P. 34](#)

The weight data for the motor type IMB5/V1 can be taken from:

- [↗ Chap. 4.1.6 P. 34](#)
- custom-order motors from the manufacturers' motor lists

4.1.12

Noise levels

The airborne noise levels in the machine room at a distance of 1 m for the standard version of the machine TW130 with operation at normal rating are:

ATR_1_22_032_0

Version	[dB(A)]
TW130 with motors of type DTE132 – DTE140	≤ 70
TW130 with motors of type DTE180 – DTL180	≤ 74

Tab. 12

ATR_1_21_0016_0

4.2 Dimensions

4.2.1 Machine

Standard version with horizontal motor position (shown is machine with traction sheave position on right)

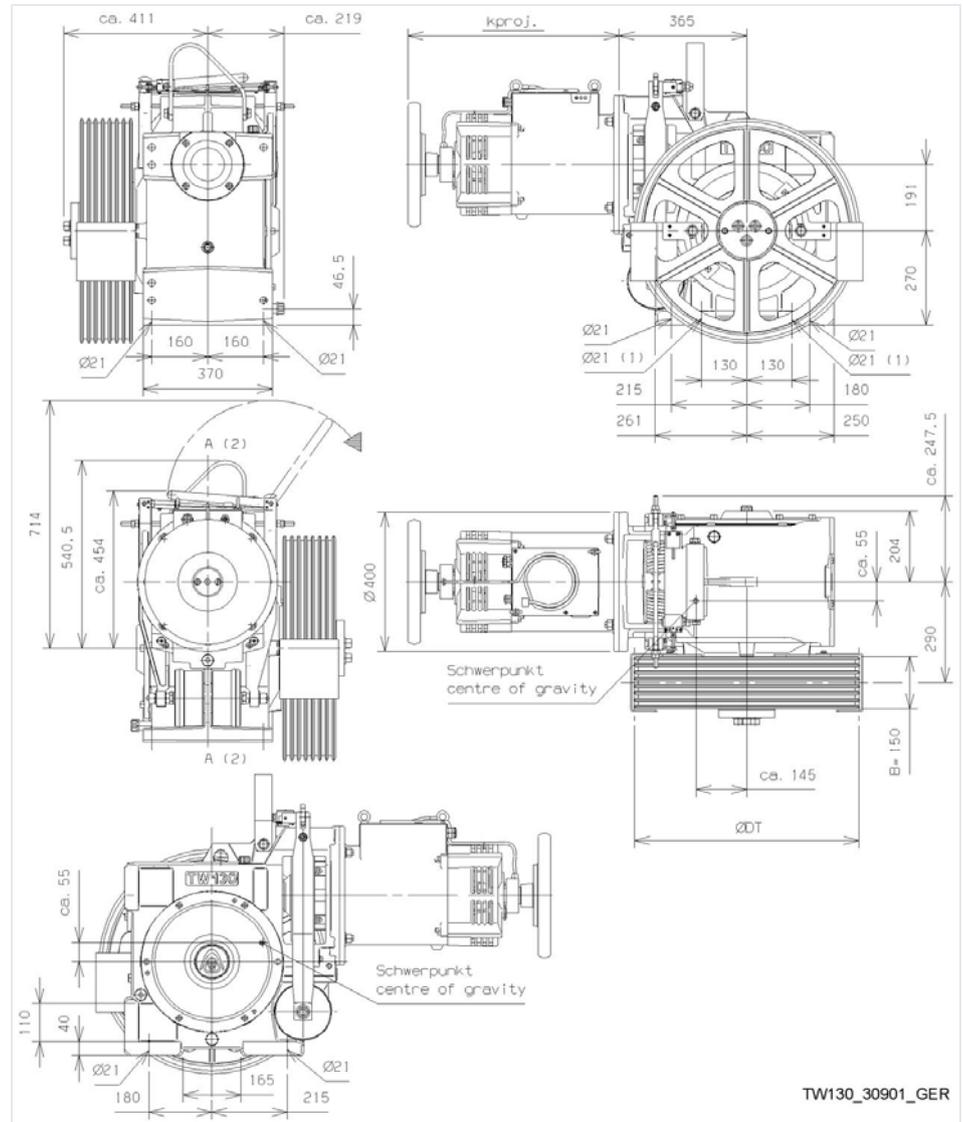


Fig. 15

ATR_2_12_0119_0

Item	Designation	Item	Designation
1	Additionally for SA1	2	Pictured: traction sheave position right/left mirror-inverted to A-A
3	Brake release lever position with traction sheave DT=540, 640 and 720		

Version with NBS emergency brake system (shown with machine in the horizontal motor position, and right-hand traction sheave position)

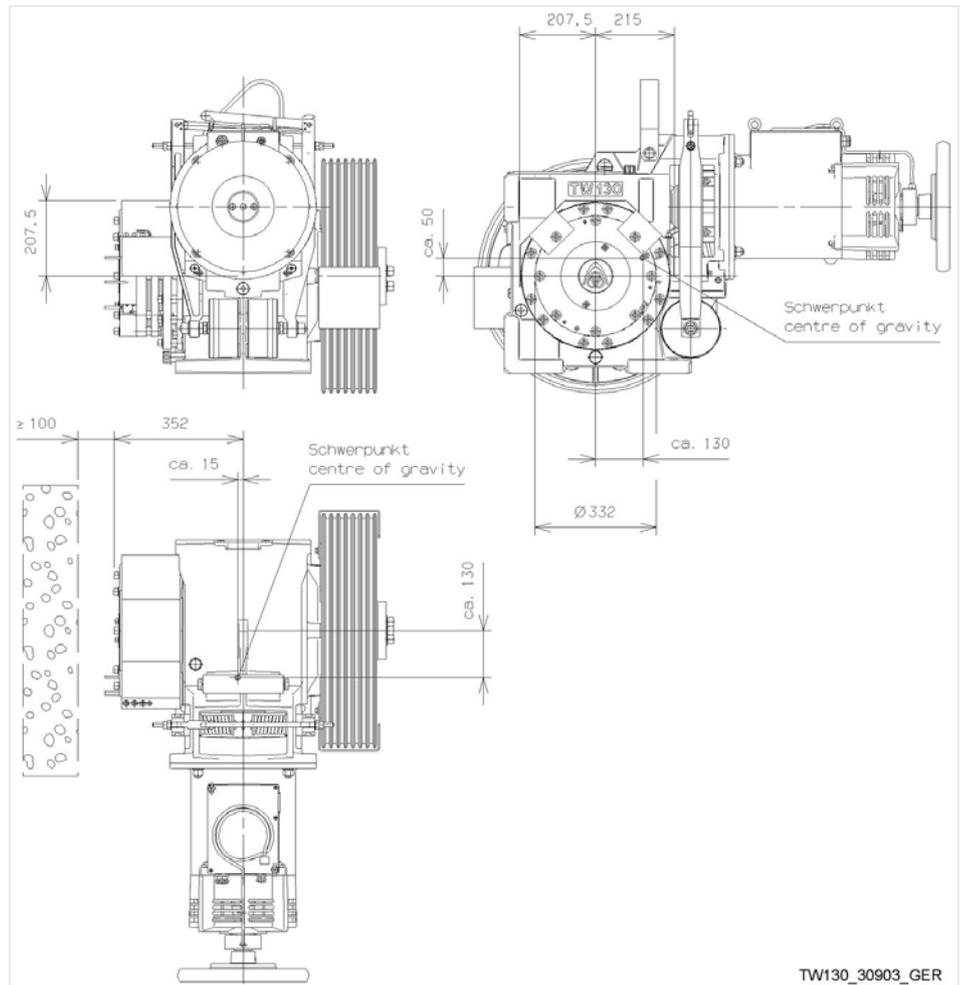


Fig. 17

ATR_2_12_0121_0

Version for traction sheave in the shaft – SA9

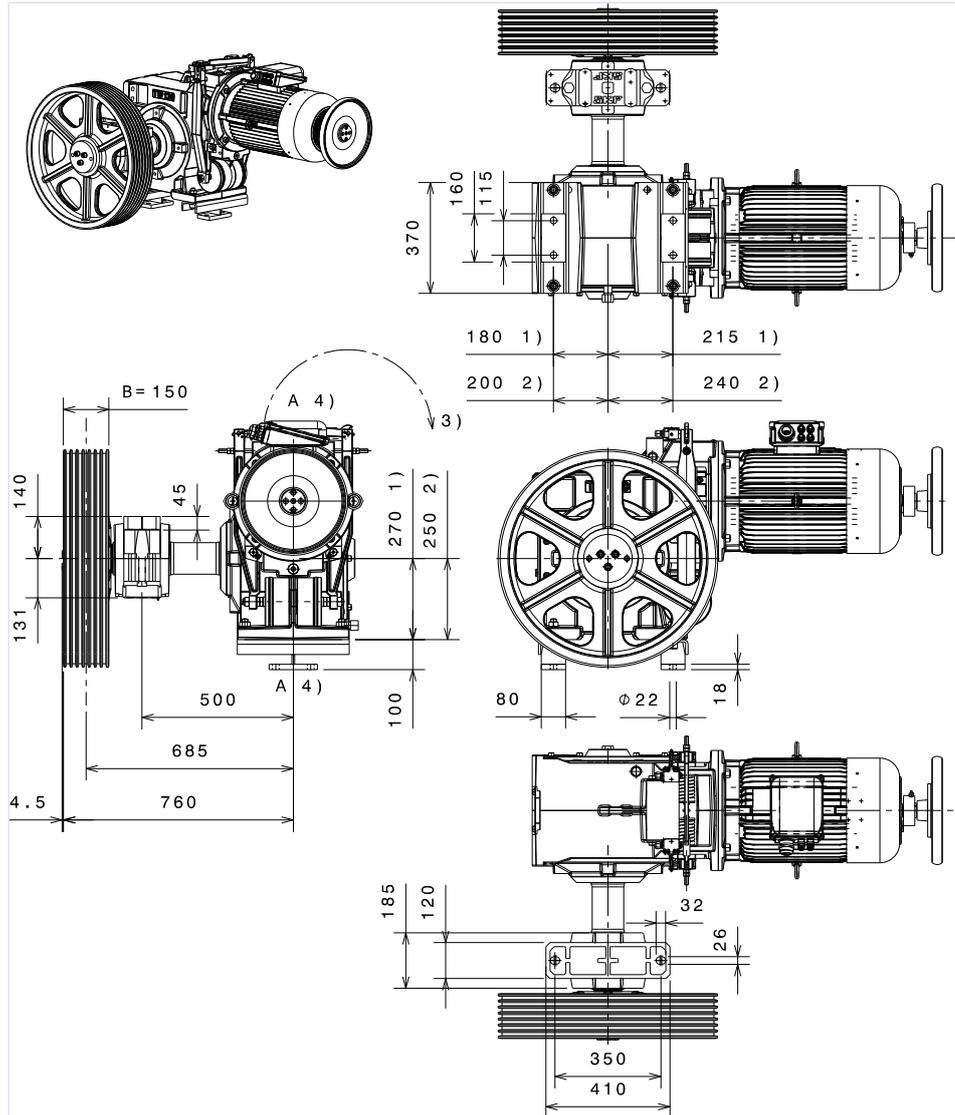


Fig. 18

ATR_2_12_0122_0

Item	Designation	Item	Designation
1	Horizontal motor position	2	Vertical motor position
3	Manual release of operational brake	4	Only with horizontal motor position: Pictured: Traction sheave position – left/right is mirror-inverted to A-A

Version for position of traction sheave in the shaft – SA9 in combination with emergency brake – NBS (shown: Motor position – horizontal and upward outside bearing support)

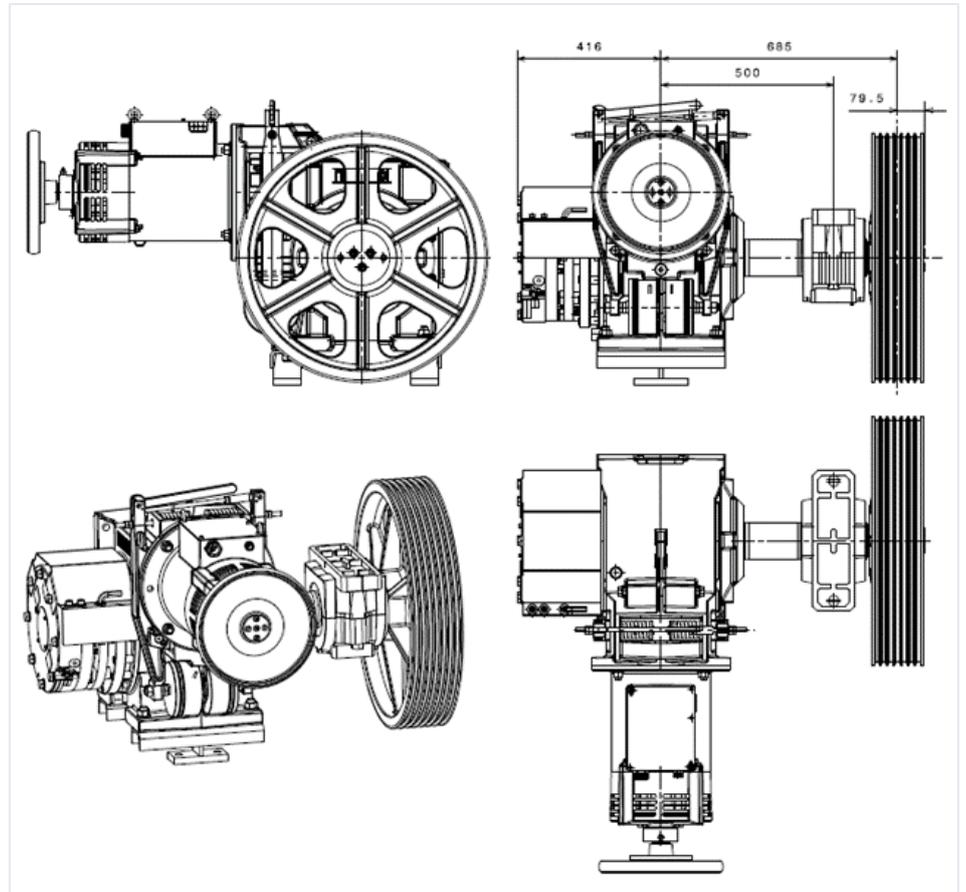


Fig. 19

ATR_2_12_0123_5

4.2.2 Machine base frame

TW130 O SR machine base frame - version without rope pulley

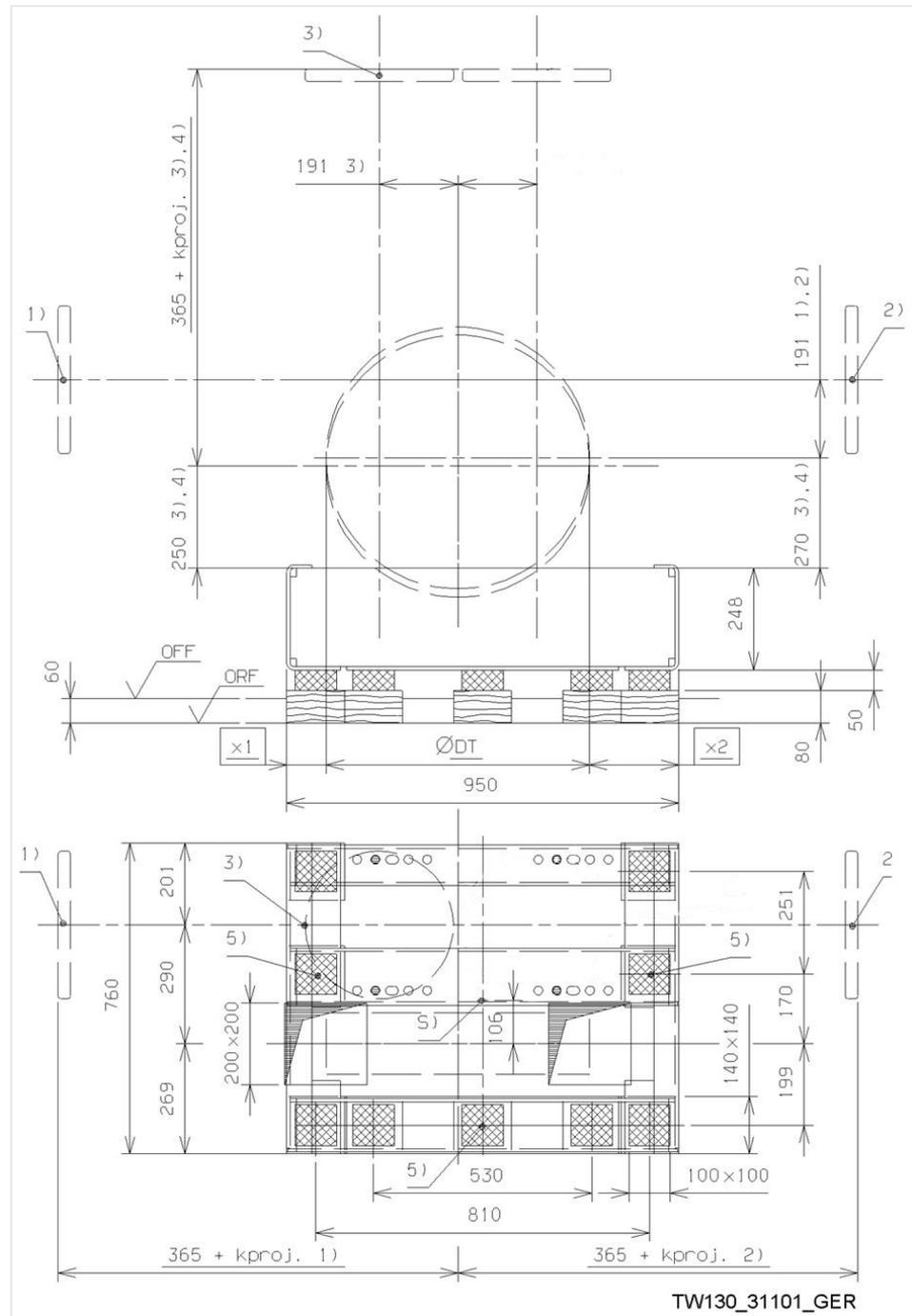


Fig. 20

ATR_2_12_0124_0

Item	Designation	Item	Designation
1	Horizontal motor position/traction sheave position – right	2	Horizontal motor position/traction sheave position – left
3	Vertical motor position/traction sheave position – left		
5	Additional insulation element for Ft > 55 kN	S	Centre of gravity, machine base frame

Project planning dimensions:

Designation	Unit	Project planning dimensions x1 and x2					
		Vertical		Horizontal			
Motor position							
Traction sheave position		left		left	right		
Project planning dimensions		x1	x2	x1	x2	x1	x2
DT 540 traction sheave	[mm]	310	100	125	285	285	125
DT 640 traction sheave		215	95	120	190	190	120
DT 720 traction sheave		135	95	115	115	115	115

Tab. 13

ATR_1_21_0043_0

Project planning dimensions x1 and x2 depending on vertical / horizontal motor position, traction sheave position left / right and traction sheave diameter DT.

TW130 M SR machine base frame - version with rope pulley in right-hand pulley hub position

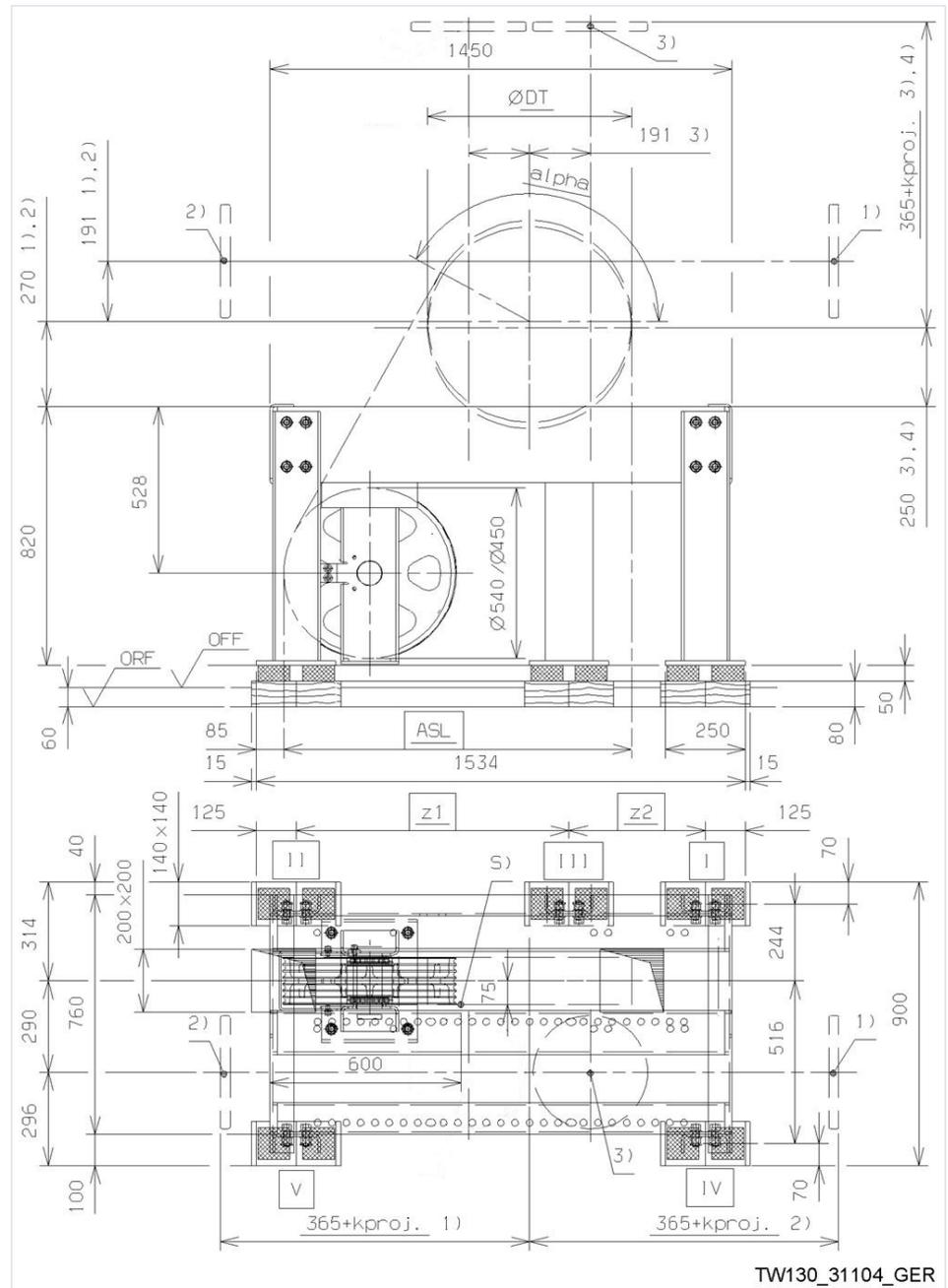


Fig. 22

ATR_2.12_0126_0

Item	Designation	Item	Designation
1	Horizontal motor position/traction sheave position – right	2	Horizontal motor position/traction sheave position – left
3	Vertical motor position/traction sheave position – left	S	Centre of gravity, machine base frame

Project planning dimensions:

Designation	Unit	Project planning dimensions for horizontal motor position							
Traction sheave position		Left				Right			
Project planning dimensions		ASL min	α max	ASL max	α min	ASL min	α max	ASL max	α min
DT 540 traction sheave	[mm] and [°]	692	169	1267	137	682	169	1302	136
DT 640 traction sheave		787	169	1272	142	777	170	1307	140

Tab. 14

ATR_1.21.0044_0

Elevator car/counterweight rope clearance dimensions ASL and wrap angle diameter for machine with horizontal motor position.

Designation	Unit	Project planning dimensions for vertical motor position			
Traction sheave position		Left			
Project planning dimensions		ASL min	α max	ASL max	α min
DT 540 traction sheave	[mm] and [°]	662	171	1282	136
DT 640 traction sheave		757	171	1287	140

Tab. 15

ATR_1.21.0045_0

Elevator car/counterweight rope clearance dimensions ASL and wrap angle diameter for machine with horizontal motor position.

Designation	Unit	Rope distance elevator car - counterweight ASL [mm]														
ASL range	[mm]	< 950					950 - 1050					>1050				
Number of supports		5					4					5				
Mounting dimension $z_1^{1)}$	[mm]	428										856				
Support item no.		I	II	III	IV	V	I	II	IV	V	I	II	III	IV	V	
Number of insulation elements per support		2	2	2	1	2	2	2	1	1	2	2	2	1	1	

Tab. 16

ATR_1.21.0045_0

Intermediate values with a modular dimension of 45 mm (one stage 35 mm) between ASL-min and ASL-max are possible for the rope clearance dimensions.

Position and number of insulation elements and/or support III dependent on the elevator car - counterweight rope clearance dimensions ASL.

5 Transportation and storage

5.1 Packaging

NOTICE



Rust on components of the drive!

Damage and possibly loss of function of the product.

→ Check the "anti-corrosion foil" for damage.

The packaging varies depending on the version of the machine that is delivered. The illustration shows the vertical version:

- Horizontal motor position Special pallet 1450 x 900 mm
- Vertical motor position Special pallet 1000 x 880 mm
- Special versions SA9: Special pallet 1700 x 1240 mm
- For special version SA9, the compensation supports are packaged separately and secured to the pallet.

In the case of larger traction sheaves, the gear box casing is bolted onto wooden blocks.

The gear box is screw-connected directly onto the pallet (special pallet 1200x800)



Fig. 23

ATR_2_12_0127_0

Further packaging depends on the order and is country-specific (air/sea/land freight).

- Refer to the delivery note for the dimensions and weight.
- Observe the symbols attached to the packaging or in visible locations.
- Dispose of used packing material in an environmentally responsible manner.



Specific transport equipment and shipping braces remain with the customer.

5.2 Transport

NOTICE



Improper transport!

Damage and possibly loss of function of the product.

- Do not place heavy objects on the assembly when packaged.
- Protect it against impacts and falling.
- Protect it against water and extreme temperatures .
- Comply with safety regulations.
- Pay attention to the centre of gravity of the product.

5.3 Fork-lift truck transport

⚠ WARNING



Protruding or tilting parts.

In the event of impact, transported goods can lead to severe crushing injuries or cuts and possibly fatal injuries.

- When effecting transport with a fork lift, use adequately long forks to prevent tipping over.
- During transport, keep a safe distance to persons.
- Always pick up at the frame or transport pallet with the forks, not the machine itself.

5.4 Crane transport

⚠ WARNING



Suspended load!

Falling transported goods can lead to severe crushing injuries or cuts and possibly fatal injuries.

- Do not walk underneath suspended loads.
- Only use tested and adequately dimensioned lifting gear.
- The specified means of transport are only configured for transportation of the machine, the installed brake and traction sheave. Do not use them to transport any other loads.

Dimensions and weight

1. Specified weights, see packaging with label.

2. Dimensions, see delivery note.
3. Approximate specifications, see ↗ Chap. 4.1.11 P. 37.
4. Machine without frame on rope with transport hanger.
5. In the case of a machine that is mounted on the machine base frame, attach a transport rope to the base frame.
6. Secure the machine against slipping and falling over.
7. In the case of machines without a machine base frame, attach a transport rope to the transport hanger.

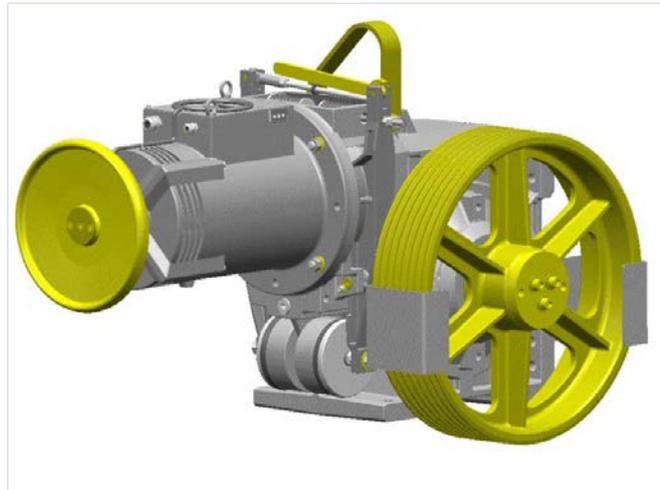


Fig. 24

ATR_2_12_0129_0

⚠ NOTICE!

Do not damage the handwinding wheel. Ropes or chains must not make contact with the handwinding wheel during transport.

8. Guide two round slings / lifting belts through the gear housing below the flange area.
9. Move the round slings / lifting belts to the right and left as shown in the illustration.



Fig. 25

ATR_2_12_0128_0

Item	Designation	Item	Designation
1	Round slings/lifting belts	2	Flange surface

5.5 Checking the delivery

WARNING



Severe transport damage to the product.

Can lead to a malfunction of the product and thus to death or serious injury.

→ Before commissioning, ensure that there is no severe damage to the product.

1. Check delivery for completeness.
2. Compare with the ordering and delivery documents.
3. Check the packaging for damage and any other conspicuous anomalies.

In the case of damage

1. Do not commission a damaged product.
2. Any damage that is determined is to be documented immediately by means of a sketch, photo or description of the damage.
3. Report damage to the manufacturer.

5.6 Intermediate storage

- The product may be exposed to a maximum relative air humidity of 60% (at 20 °C).
 - Store the product carefully in a protected location:
 - Protect it against the formation of condensation and moisture.
 - Protect against dirt in the machine.
- In the case of downtimes of longer than one year, carry out standstill maintenance [↗ Chap. 9.1 P. 83](#) Standstill maintenance.

6 Installation

6.1 Setting up the machine base frame

To reduce noise and sound transmission, we offer insulation elements that can be inserted between the frame supports and floor. These differ according to the type of mounting:

- A rubber block 100 x 100 x 50 high without base is used to mount the drive on the machine room floor without a cement floor or directly surface-mounted on the cement floor.
- For installation on cement floor, packing cast into cement floor (thickness ≤ 60 mm). The packing component must be cast in when installing the cement floor. A rubber block 100 x 100 x 50 with additional packing 140 x 140 x 80 mm is used here.

The number and arrangement of rubber elements is based on the total load and the distance between the rope lengths (ASL dimension = distance between rope departures).

The individual load required here should be between 7 kN and 12 kN per element.

When arranging the supports, the overall centre of gravity must lie within the rubber elements.

The arrangement under the machine base frame should be such that the stress and/or buffering of the insulation elements (maximum difference 3–5 mm) is as even as possible.

6.2 Aligning the machine

The machine is to be set up according to the plan of installation. The rope departure from the traction sheave is to be aligned plumb to the elevator car mounting or the elevator car rope pulley and the counterweight according to the drawing. With load applied to the ropes, the machine should be aligned vertically on its installation surface. Irregularities must be balanced out by inserting shims under the floor support.

SA9 traction sheave in the shaft, machine with extended traction sheave shaft and pedestal bearing.

1. Fitting and mounting of the compensating supports.
2. Horizontal alignment of the traction sheave shaft.
3. Align the bearings of the machine and the outside bearing exactly.

Installation of the compensating support for SA4/SA9

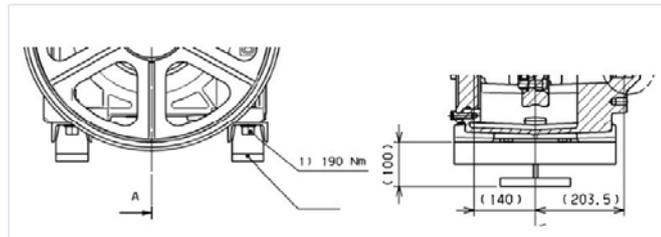


Fig. 26

ATR_2_12_0130_0

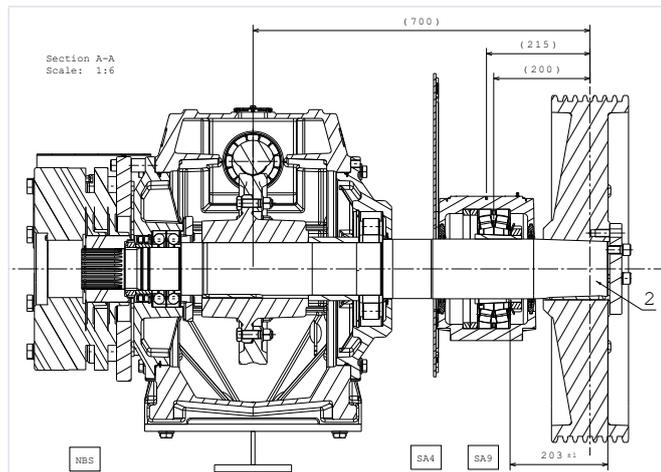


Fig. 27

ATR_2_21_0244_0

1. Mount the compensating supports on the machine housing from underneath.
 - ▷ Tighten 4x M20x80-8.8 with 8x SKM20 detent edged washers to 370 Nm.

6.3

Mounting the frame with rope pulley

NOTICE**One-sided load on component and or drive set up on a slant!**

Failure of the drive involving damage.

- The drive must be horizontal.
- Use a spirit level to check; add support if necessary.
 - ▷ Secure the drive on the machine base frame against shifting with adjusting screws or stops.
- Arrange the suspension ropes symmetrically on the suspension plate, traction sheave and rope pulleys.

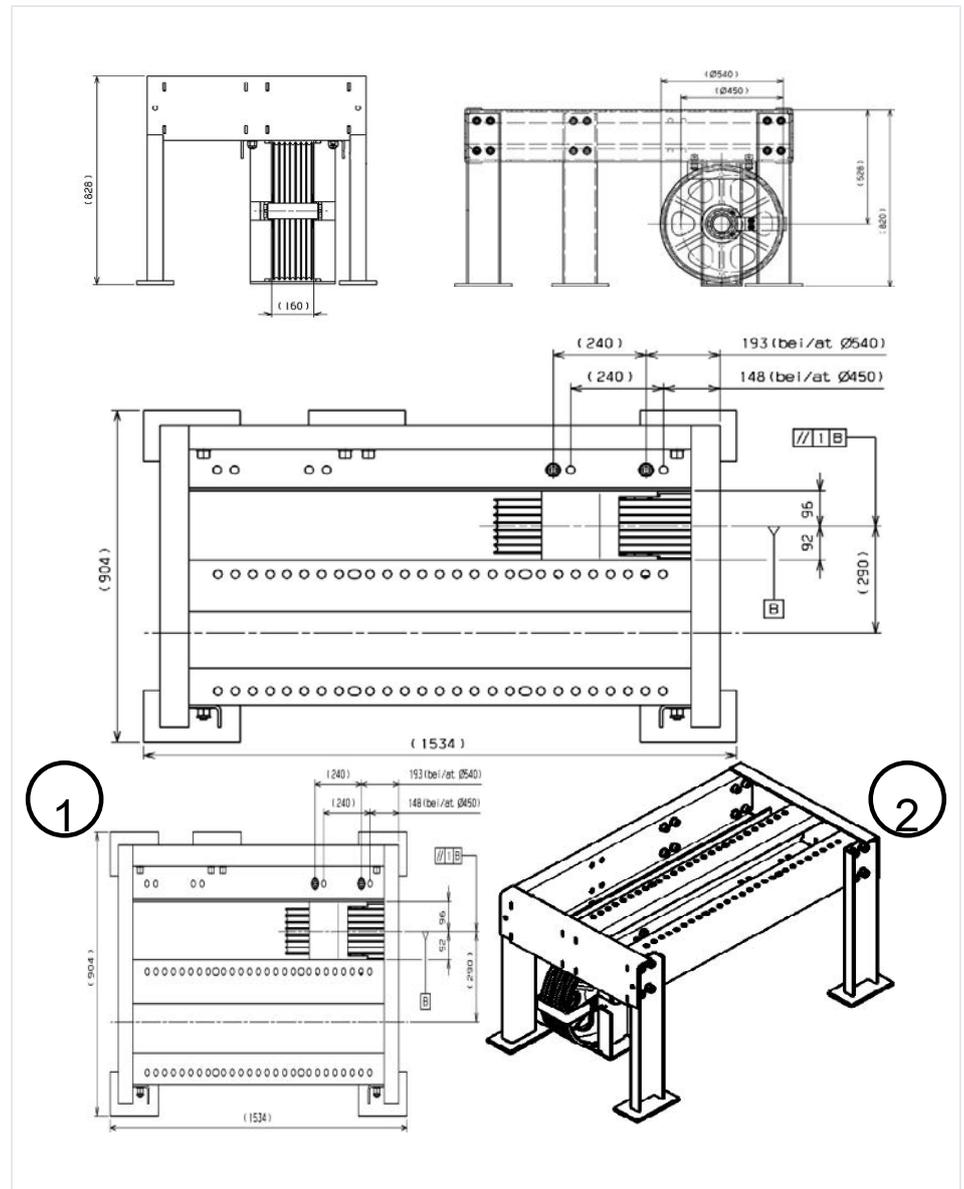


Fig. 28

ATR_2_21_0213_0

Item	Designation	Item	Designation
1	Position of the rope pulley on the right	2	Position of the rope pulley on the left

- The version can be found in the plan of installation.
- Mount the delivered frame (upper frame part, supports and pulley frame with rope pulley) loosely together in the machine room.
- Tighten the connecting bolts (M20-8.8) of the supports to 370 Nm.
- Tighten the connecting bolts for the pulley frame (M16-8.8) to 190 Nm.
- Position the frame on the insulation elements in accordance with the plan of installation.
- Lift the machine onto the frame using lifting tackle.
 - ▷ The traction sheave must rest on the diverter pulley side.
- Bolt the machine onto the frame, whereby the machine housing must not be tensioned.
 - ▷ Use the supplied shims for compensation.

8. Align the rope grooves of the traction sheave and diverter pulley in parallel.
9. Tighten the screws to the required torque.
 - ▷ Tighten 4x M20-8.8 to 370 Nm.
10. Plumb the rope departure on the rope pulley and/or mounting on elevator car and counterweight.
11. An additional set of connecting elements (SA1 – 6x M20 + 2x M16) is used for horizontal rope departures.

6.4

Mounting the rope guard

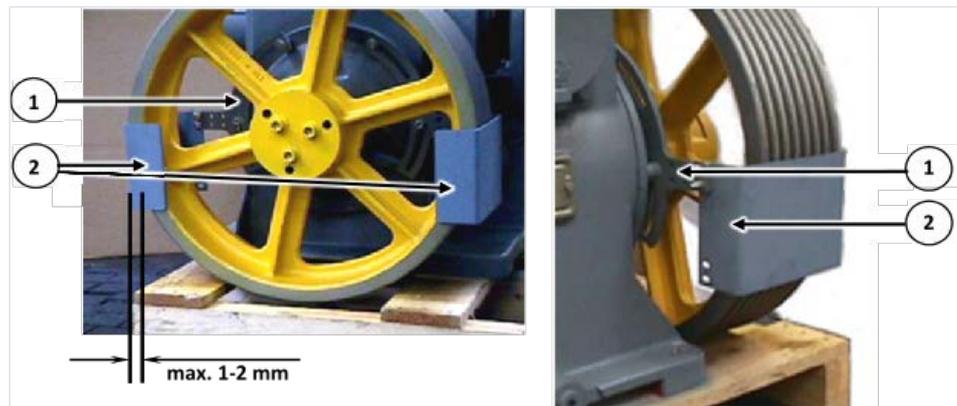


Fig. 29

ATR_2_12_0091_0

Item	Designation	Item	Designation
1	Rope guard carrier	2	Rope guard

1. Use the enclosed screws to bolt the rope guard onto the rope guard carrier.
2. Pivot the rope guard carrier to set the guard in such a way that the clearance between the rope and hoop guard on the rope run-in and run-out side of the traction sheave is as small as possible (1–2 mm).
3. Adapt the inclined pulling location of the rope guard carrier by remounting the changed rope pull direction.
4. Align the winch and tighten the securing bolts of the rope guard carrier to the prescribed torque [↗ Chap. 10.1 P. 84.](#)

i

For machines with rope run-in direction of 0–90° above the horizontal (e.g.: machine arrangement up/down beside), an additional rope guard is required to prevent foreign bodies from entering between the rope and groove. If the rope run-in zone is protected within the machine base frame, the function "protection against injury" is not required.

i

For SA9 traction sheave in the shaft, no rope guard is fitted at the plant.

6.5

Mounting the rope guard complying with EN81-77

1. Mount the rope guard carrier on the machine's pre-assembled rope guard carrier.
2. Align the rope guard carrier with the rope guard via the rope inlet and outlet.
3. Setting the distance between the rope guard and the rope outer diameter to approximately 2 mm.

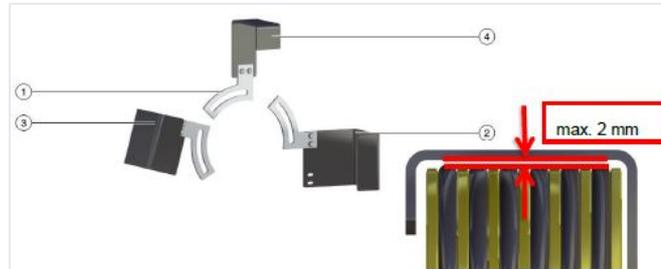


Fig. 30

ATR_2_12_0137_0

Item	Designation	Item	Designation
1	Rope guard carrier	2	Rope guard, long
3	Rope guard, long	4	Rope guard, small

6.6

Shift protection on the machine base frame

The entire shift protection consists of four units in total.

The fastening materials (Hilti HST M16/25 or Fischer M16/25 FAZ II) are included in the scope of supply and must be attached to the unfinished concrete floor.

→ Comply with the installation instructions of the manufacturer.



In locations where the distance to the wall is < 250 mm, the standard shift protection devices must be replaced by devices for low wall clearances.

The shift protection is configured for the following machine insulations:

- Insulation elements without underlay for machine room without floor pavement
- Insulation elements with underlay for machine room with floor pavement (≤ 60 mm height); underlay made from Multiplex laminated wood 140x140x80 mm.

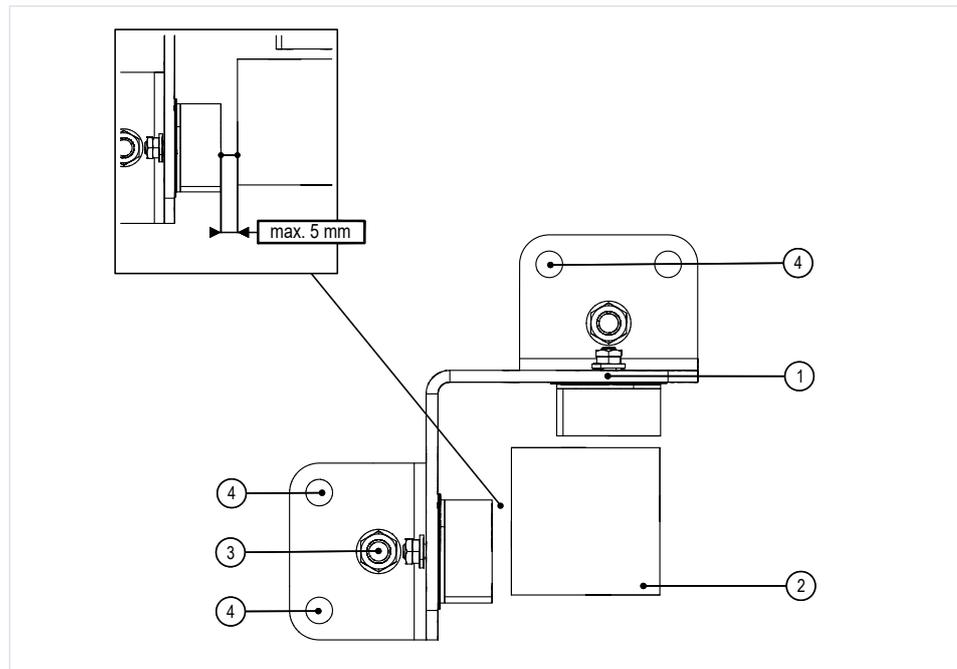


Fig. 31

ATR_2_00_0002_0

Item	Designation	Item	Designation
1	Shift protection	2	Machine base frame
3	Anchoring device	4	Alternative holes

1. Position the shift protection elements contact-free with a slight clearance (maximum 5 mm) to the machine base frame and make marks.
 - ▷ If there is steel reinforcement in the concrete, use alternative holes.
2. Drill holes for the anchoring devices at the marked positions.
 - ▷ Use 1 anchoring device per tab.

6.7

Electrical connection

⚠ WARNING**Inadequate connection**

Electric shock. Damage to drive.

- Earth the motor and brake magnet in accordance with country-specific regulations.
- Electrical connections must correspond to at least the protection class in accordance with the name plate and/or required country-specific protection class.

⚠ WARNING



Live parts!

Electric shock.

- When connecting the machine, comply with the relevant regulations. Never work when the voltage is switched on!
- Ensure reliable earthing (loop resistance).
- Here, configure connections in both terminal boxes.

6.7.1

Connecting the machine

NOTICE



Incorrectly connected cables!

May lead to impairment or loss of function of the product.

- When connecting the motor, comply with the terminal connecting plan on the back of the cover on the motor terminal box and/or the motor connection terminal diagram.
- In the case of frequency-controlled machines, ensure EMC-compliant installation of the motor and posistor (use suitable shielding).

DTE/DTL motors

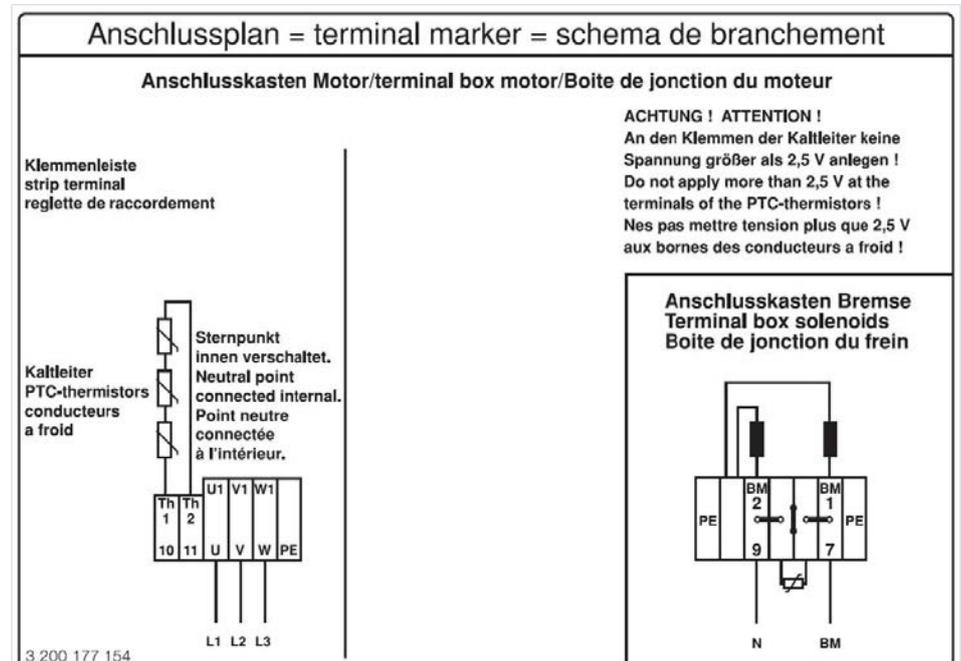


Fig. 32

ATR_2_12_0139_0

Motor lift for motors

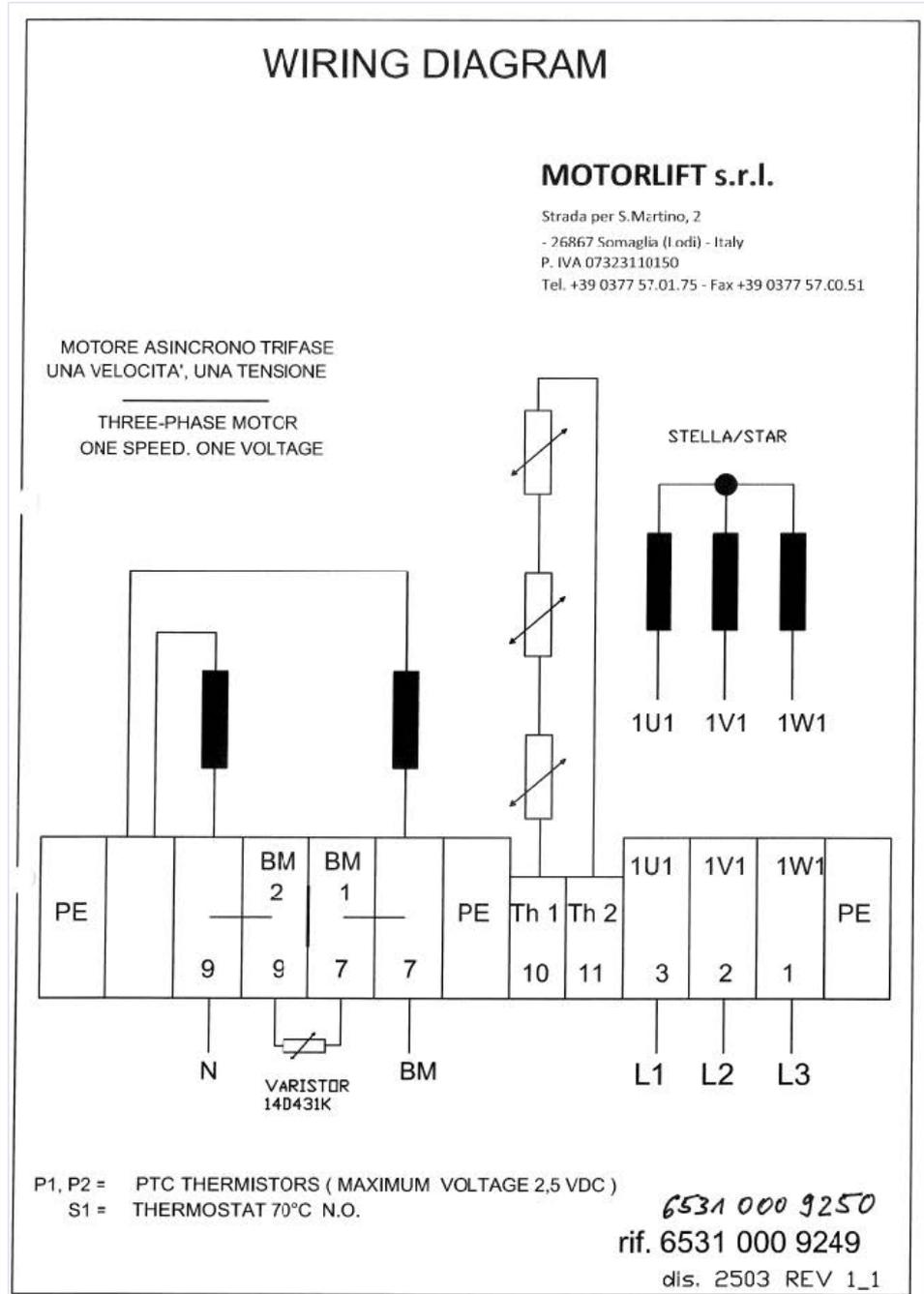


Fig. 33

ATR_2_12_0140_0

DTE132/140/180, motor lift CMRF160L1 and motors made by EMOD

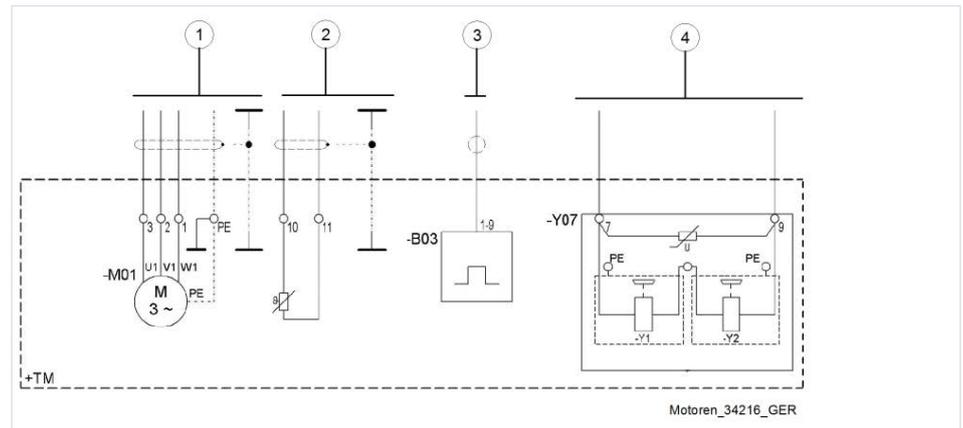
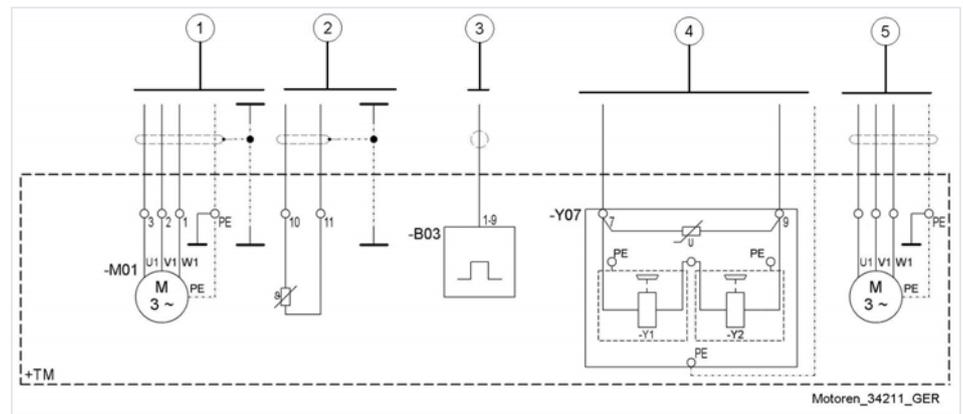


Fig. 34

ATR_2_12_0141_0

Item	Designation	Item	Designation
1	Motor	2	Posistor
3	Encoder	4	Brake (intermediate clamping)

DTL



Item	Designation	Item	Designation
1	Motor	2	Posistor
3	Encoder	4	Brake (intermediate clamping)
5	External ventilation (only for DTL180)	6	

6.7.2

Connecting the motor line

1. Strip the insulation from the connection line.
2. Route cable through the cable gland.
3. Connect the PE conductor to the screwed connection specifically designed for the purpose.
4. Connect the three motor wires to the terminals U, V and W as specified in the terminal connecting plan.
5. Pull the shielding braid evenly over the lamellar insert.
6. The braid must not protrude beyond the lamellar insert into the thread.
7. Pull the cable through the cap nut.

8. Push the cap nut over the shielding.
9. Tighten the cap nut with the recommended torque in accordance with manufacturer documentation [↗ Chap. 10.2 P. 84.](#)

6.7.3 Connecting the posistor

NOTICE



Overvoltage at the measuring device.

Defective posistor.

- Do not apply a voltage greater than 2.5 V.
- Observe the internal resistance on the measuring instrument.

A triggering device (motor protection device) is required for evaluation of the posistor temperature sensor installed in the motor.

1. Strip the insulation from the connection line.
2. Connect both wires in accordance with the terminal connecting plan.
3. Tighten the cap nut with the recommended torque in accordance with manufacturer documentation [↗ Chap. 10 P. 84.](#)

7

Work on the product

7.1

Replacing the brake shoes

With a remaining lining thickness of less than or equal to 3 mm or if the linings are damaged (e.g. glazing), the brake shoes incl. the brake lining must be replaced.

Disassembly

1. Disconnect the power from the installation and secure it against reactivation.
2. Remove the nuts and spherical washer.
 - ▷ Take out the tension spring with add-on parts.

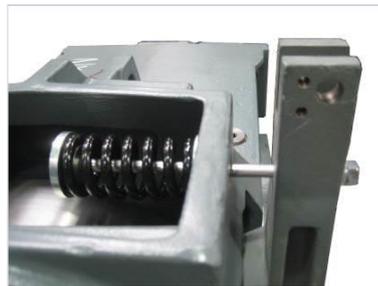


Fig. 35

ATR_2_12_0100_0

3. Remove the brake shoe bolt locking screws.
4. Slide the cover ring of the armature base plate over the magnetic clamp.
5. Remove the counter nut of the anchor bolt.
 - ▷ Press the anchor bolt and armature base plate together slightly.
 - ▷ The gap between the magnetic clamp and armature base plate is enlarged.



Fig. 36

ATR_2_12_0101_0

6. Pull the brake shoe bolt out of the housing using the locking screw.
7. Remove the compression spring, spring plate and screw.
8. Remove one brake shoe.

Installation

1. Mount the armature base plate on the new brake shoe.
2. Check the ease of movement of the armature base plate; adjust if necessary.
 - ▷ It should be possible to move the armature base plate with low resistance.
 - ▷ If necessary, grease the rubbing surface between the armature base plate and anchor bolt.
3. Secure the settings of the armature base plate pre-tension with the counter nut.
4. Install brake shoes, bolts and locking screws for the bolts.
 - ▷ The end thread in the bolt must point outwards.
5. For maximum spring travel, preload the springs with the hexagon nut.
 - ▷ with nominal force 2500, magnetic clamp diameter D130 mm, 2 x 125 Nm, initial tension 13.5 mm (approx. 10.8 revolutions)
 - ▷ With nominal force 5000, magnetic clamp diameter D160 mm, 2 x 200 Nm, initial tension 17.0 mm (approx. 9.7 revolutions)
 - ▷ Secure the setting with the counter nut.

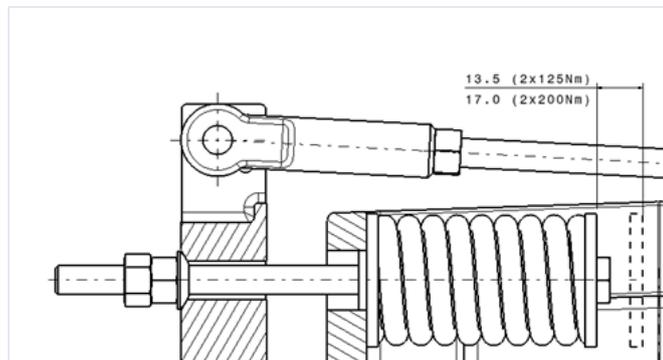


Fig. 37

ATR_2_21_0227_0

6. Set the brake shoe stroke by adjusting the armature base plate screw on the brake shoe.
 - ▷ Brake shoe stroke at the narrowest point $0.1 + 0.05$ mm. This corresponds to approximately 0.35 to max. 0.6 mm in the middle of the brake disc.
 - ▷ Check the brake shoe stroke with electrical pick-up.
7. Push the rubber ring over the gap between magnetic clamp and armature base plate.
8. Modify, replace and set the second brake shoe in the same manner.
9. Set the operation position of the brake release lever at $5-10^\circ$ above the horizontal.
10. Use electrical recall to move the elevator and observe whether both brake shoes open evenly.
11. Check the stroke paths and deceleration; if required, adjust.

7.2

Setting the brake shoe stroke and armature base plate

- ✓ Before initial operation and during monitoring, the working stroke of the brake shoes, the initial tension of the brake springs and initial tension of the armature base plates must be checked.
1. Check the rubber disc between the armature base plate and the brake shoe.
 - ▷ Readjust the initial tension between the brake shoe and armature base plate.
 2. The armature base plate can be rotated with suction on the anchor bolt.
 3. Align a dial gauge on the brake shoe at the height of the centre of the brake disc.
 4. Switch on the drive and check the stroke of the brake shoes.
 5. In the event of deviations, loosen the counter nut.
 6. Readjust the anchor bolt and, on opening, ensure that the brake shoes have the same stroke.
 7. Secure the setting.

A correct setting of the initial tension is only possible within the framework of a deceleration measurement. In doing so, do not exceed the maximum initial tension distance of 13.5 mm and/or 17.0 mm.

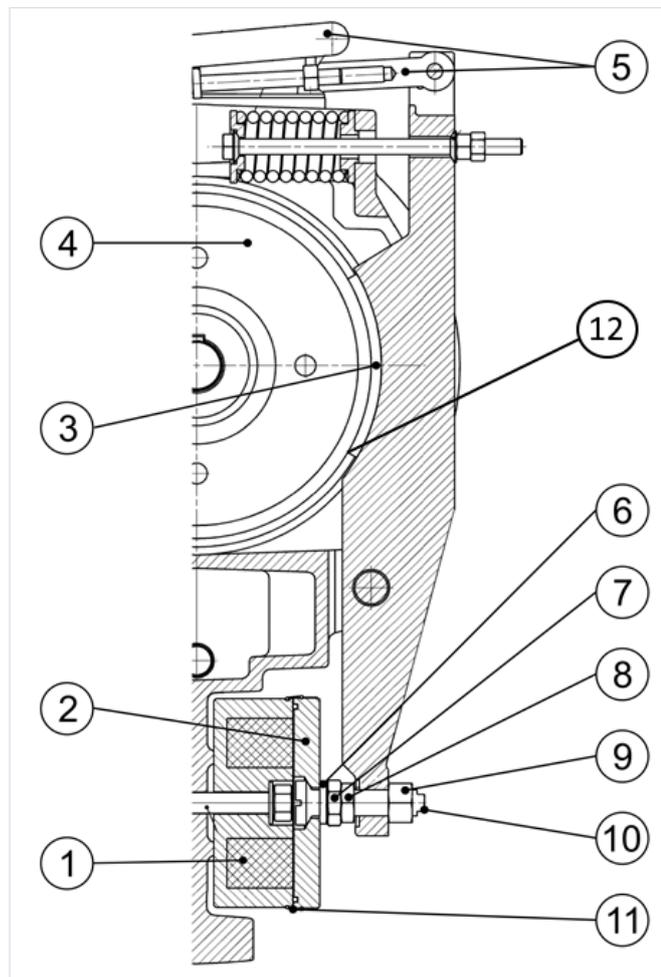


Fig. 38

ATR_2_21_0231_0

Item	Designation	Item	Designation
1	Magnetic clamp	2	Armature base plate
3	Working stroke of shoes 0.35 to max. 0.6 mm on the middle of the brake disc	4	Brake disc
5	Brake release lever, pressure piece with pressure rod	6	Rubber disc
7	Disc	8	Hexagon nut
9	Counter nut	10	Anchor bolt
11	Cover ring	12	Working stroke at the narrowest point 0.1 + 0.05 mm

If brake test switches are present, these must be checked or adjusted after brake adjusting [↗ Chap. 3.3.3 P. 24](#) [↗ Chap. 10 P. 84](#).

7.3

Braking deceleration setting

The brake adjustment is to be carried out only with one effective brake shoe with the elevator car loaded with the rated load on a descending run (full down) or with an empty elevator car on an ascending run (empty up) according to the deceleration values in the table below. Brake shoe stroke at the narrowest point 0.1 + 0.05 mm. This corresponds to approximately 0.35 to max. 0.6 mm in the middle of the brake disc. The braking torque must be set by pre-tensioning the brake springs in relation to the system, evenly across both brake shoes.

Braking deceleration	Machine with handwinding wheel		
v in m/s	≤ 0.63	≤ 1.25	> 1.25
a in m/s ² (full down)	≤ 0.3	≤ 0.4	> 0.50
a in m/s ² (empty up)	≤ 0.5	≤ 0.6	> 0.75

Tab. 17

ATR_1_21_0032_0

If brake test switches are present, these must be checked and/or readjusted after a brake setting. [↗ Chap. 3.3.3 P. 24](#).

7.4

Brake readjustment in the event of brake lining wear

With wear on the brake linings, the stroke of the brake shoes increases compared with the reference state. At a limiting value of 0.6 mm, the following settings on the brake are to be checked and, if necessary, corrected:

1. Armature base plate pre-tension: Check and, if required, adjustment of the pre-tension.
2. Stroke of the brake shoes: Setting to the reference value.

3. Bias voltage of the compression springs: Setting the reference value to max. 13.5 mm and/or 17 mm as well as checking the deceleration
↗ Chap. 7.3 P. 66.

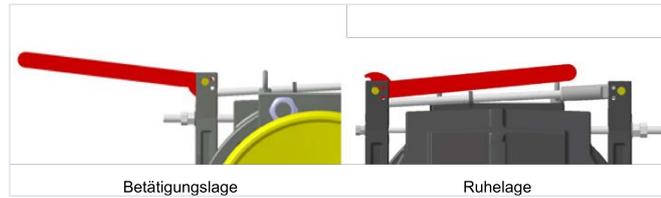


Fig. 39

ATR_2_22_0023_0

7.5

Test of one brake circuit

1. Manually open the brake shoe not being tested with a suitable tool.
▷ For example, a nailing tool or a flat spanner on smaller machines.

⚠ WARNING



Brake malfunction!

Malfunction/slipping of the brake being tested.

- The tool must not be secured in the brake's open position.
- The installation tool must be operated by a qualified person.
- The brake must be able to re-engage immediately.



Fig. 40

ATR_2_21_0238_0

2. Carry out a brake test/emergency stop using the brake being tested.
3. Repeat the operation on the other brake.

7.6

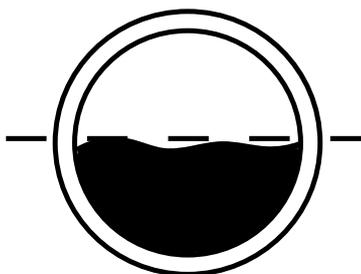


Fig. 41

ATR_2_12_0316_0

Checking the oil level

- Check the oil level.
 - ▷ The oil level should be ± 5 mm outside of the centre.
 - ▷ To top up, the machine should be out of service for five minutes.

7.7

Lubrication

NOTICE**Possible bearing damage!**

Damage to the gear due to unsuitable lubricant.

→ Only use the specified gear oil.



The machine is delivered full of oil.

Lubricant	Replacement interval	Motor position/filling quantity
Synthetic gear oil SM1	For the first time after 4 years then every 8 years	vertical approx. 25.0 litres horizontal approx. 20.0 litres

Tab. 18

ATR_1_21_0024_0

⚠ WARNING**Danger of scalding**

Long-term car operation heats up the oil!

→ During work on the drive, wait until the housing has cooled down, if necessary.

1. Heat the gear to operating temperature (approx. 35 °C) before changing the oil.
2. Drain off the gear oil by removing the cap on the oil drain pipe.
3. Collect the old oil in a container specifically designed for the purpose.
4. Empty the gear and close off the cap on the oil drain pipe with PTFE sealing tape.
 - ▷ Check for leakage.
5. Remove the red locking screw "OIL" and fill the gear housing until the prescribed oil quantity is reached.
6. Check the level at the oil gauge glass.
7. Never mix different types of oil
8. Do not dispose of oil where it can enter the groundwater.
9. Dispose of old oil as well as cloths contaminated with oil and grease according to prevailing regional regulations.
10. Use of gear oil approved by TK Aufzugswerke GmbH.
11. TK Aufzugswerke GmbH will not be held liable for damage resulting from the use of non-approved lubricants.

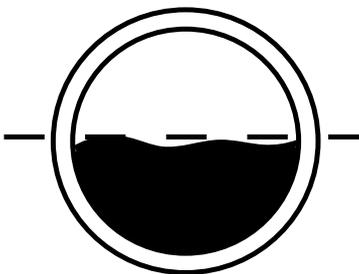


Fig. 42

ATR_2_12_0316_0

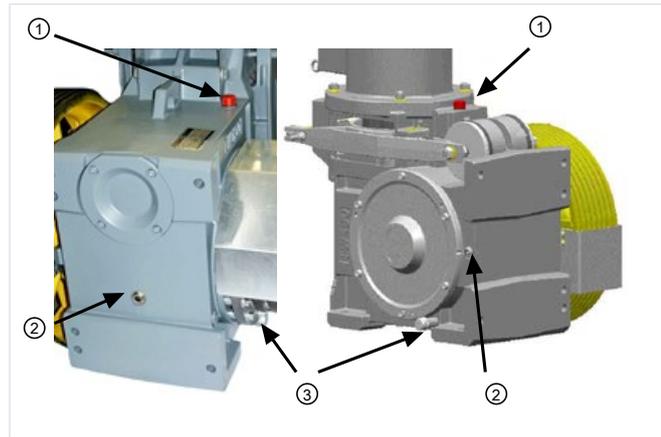


Fig. 43

ATR_2_21_0216_0

Item	Designation	Item	Designation
1	Ventilation, filling opening	2	Oil gauge glass
3	Oil drain	4	

7.8

Checking the backlash

If the running performance deteriorates, this might have been caused by excessive backlash in the worm gear toothing.

Wear on the worm wheel gear toothing changes the actual tooth thickness and this can be determined using the following measurement of the backlash.

NOTICE



Backlash too great!

Teeth on worm wheel worn; deterioration in running performance.

- If the running performance deteriorates (noises, jerking, etc.), measure the backlash.
- If a wear limit value (backlash) of 1.5 mm is reached, replace the gear teeth.

1. Disconnect the power from the installation and secure it against reactivation.
2. Secure the car and counterweight against movement.
3. Take the load off the traction sheave.
 - ▷ The traction sheave must be free to move.
4. Perform the measurement with the operational brake closed.
5. Release the emergency brake, if present.
6. Fit a measuring attachment to the traction sheave, e.g. screw clamp.
7. Specify the measured radius (M) and mark the measuring point.
 - ▷ The radius (r) for the TW130 = 155 mm.
8. Attach a dial gauge with magnet stator at the gear drive housing and align to the measuring point (M).
9. Turn the traction sheave by hand until the dial gauge pointer moves.
10. Move the traction sheave back and forth until resistance is felt.

11. Read the dial gauge (ME).
12. Use the formula below to calculate the backlash.
 - ▷ Backlash = $(ME \cdot r) / M$

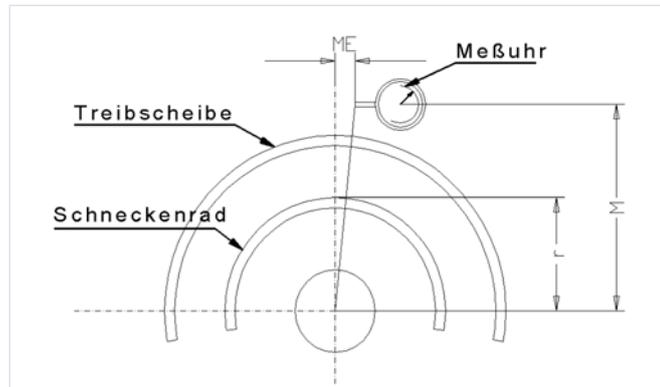


Fig. 44

ATR_2_22_0027_0

Item	Designation	Item	Designation
M	Radius	ME	Measurement result
r	Radius – worm wheel, all dimensions in mm		

7.9

Replacing the traction sheave

⚠ WARNING**Traction sheave not resting properly on cone (is loose)!**

Traction sheave tumbles and can come loose. The elevator car can move in an uncontrolled manner through the shaft.

- Do not change the dimension of the feather key, groove, cone shaft or traction sheave bore hole under any circumstances.
- Avoid damage to and contamination of the cone shaft and traction sheave.
- Secure the traction sheave with a chain or ropes.
- Ensure correct installation.

1. Disconnect the power from the installation and secure it against reactivation.
2. Secure the car and counterweight against movement.
3. Remove the cover plate on the traction sheave.
4. Take the load off the traction sheave (slack rope).
5. Take off and secure the ropes.
6. Remove the mounting bolts with tension disc.
7. Secure the traction sheave using lifting tackle.
8. Loosely screw in the tension disc with screws in the outer circle of holes of the tension disc on the traction sheave hub.
9. Place a metal spacer (e.g. disc) of approx. 10 mm thickness between the tension disc and shaft end. The diameter of the spacer must be such that it does not protrude beyond the front face of the shaft.

10. By evenly and alternately tightening the screws, pull the traction sheave off the shaft (cone).

Installation of the traction sheave

1. Clean the shaft end and traction sheave bore hole (free of oil, grease, paint)
 - ▷ Do **not** apply grease or oil to the shaft and hub!
2. Place the new traction sheave on the conical shaft end of the motor shaft.
3. Align the locations of the feather key and groove in relation to one another.
4. Push the traction sheave onto the motor shaft.

⚠ WARNING!

Adhesion force of the microencapsulated screws has no effect! The traction sheave can come loose and the elevator car can move in an uncontrolled manner through the shaft. Use microencapsulated screws a maximum of twice.

5. Use the supplied **new** microencapsulated screw and detent edged washers to attach the tension disc to the motor shaft at the inner circle of holes.
 - ▷ Retighten the screws several times to obtain the prescribed tightening torque on all three screws.
6. Comply with the prescribed tightening torque of 160 Nm (with NBS emergency brake system 190 Nm).
 - ▷ Compare torque with drawing.
1. Release the mounting of the traction sheave from the lifting tackle.
2. Hang up the ropes on the traction sheave.
3. Mount the rope guard plates.
4. Align the rope guard plates.
5. Remove the safety devices from the car and counterweight.

7.10

Replacing the motor

Disassembly

1. Disconnect the power from the installation and secure it against reactivation.
2. Secure the car and counterweight against movement.
3. Attach and secure the motor to the lifting tackle.
4. Unplug the electrical connections and lines from the motor.
5. Undo the nuts of the motor mounting on the housing flange.
6. Release the radially arranged screws for the flexible coupling on the coupling groove.
 - ▷ In the case of the flexible coupling, the elastomer part of the coupling remains screw-connected to the brake disc.
7. Carefully pull the motor off the dog clutch coupling connection.

8. If the replacement motor was delivered without a handwinding wheel and encoder, remove these from the old motor and, including the encoder mount (clip nut), use them for the new motor.

Installation

1. Place the replacement motor ready for use.
2. Compare the motor data.
3. Attach and secure the motor to the lifting tackle.
4. Align the motor to the coupling and housing flange of the gear.
5. The locations of the mounting holes must match those of the screws.
6. Push on the motor until the face of the motor contacts the gear flange or flange ring.
7. Mount the motor on the gear flange.
8. Tighten the nuts evenly alternately and cross-wise up to the prescribed tightening torque ↗ [Chap. 10.1 P. 84](#).
9. Mount radially arranged screws on the clutch hub and tighten to 220 Nm ↗ [Centaflex](#).

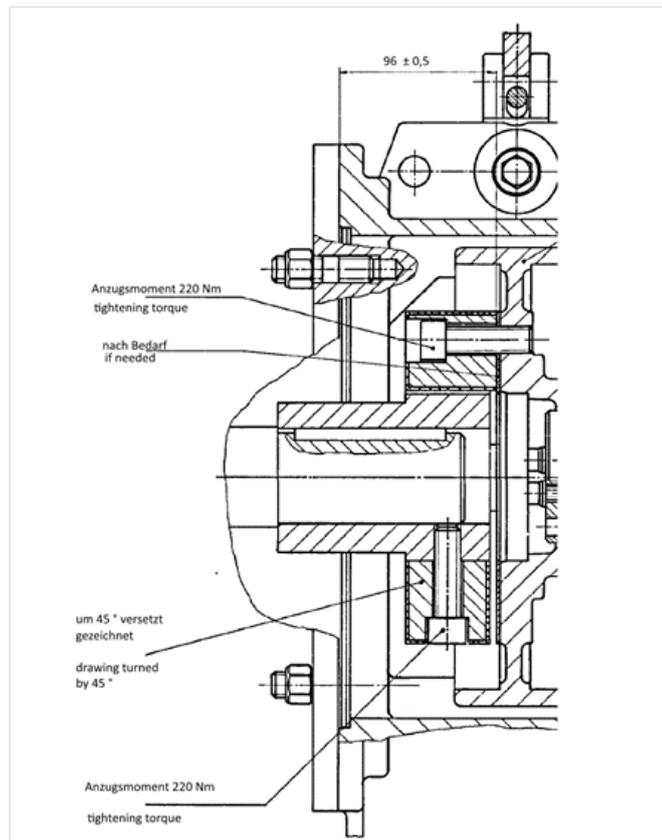


Fig. 45

ATR_2_21_0218_0

10. Connect the connection line in the terminal box.
11. Make the electrical connections as per terminal connecting plan Installation.
12. Establish the connections of the brake and encoder to the control system.
13. Check the function of the brake before starting up.

7.11

Replacing the encoder

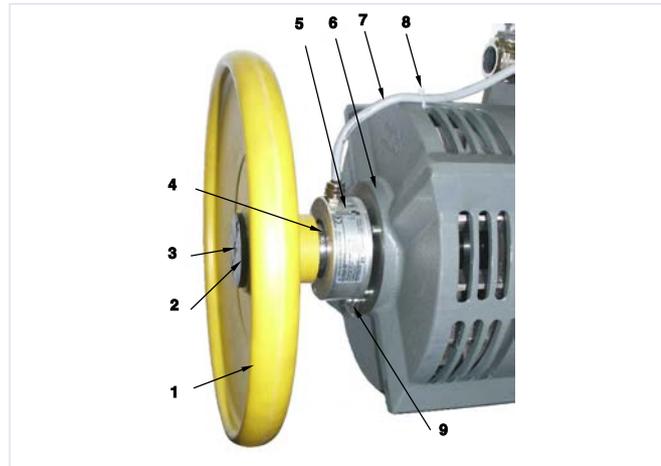


Fig. 46

ATR_2_22_0026_0

Item	Designation	Item	Designation
1	Handwinding wheel (D360 shown)	2	Locking washer
3	Flat countersunk nib bolt	4	Headless set screw
5	Encoder type WDG100	6	Motor
7	Encoder connection cable	8	Cable ties
9	Encoder mount		

Disassembly

Preparatory measures

1. Disconnect the power from the installation and secure it against reactivation.
2. Unplug the encoder connection cable at the frequency inverter.
3. Remove the central screwed connection in the middle of the handwinding wheel hub or the handwinding wheel.
4. Pull the handwinding wheel with hub off the motor shaft.
5. Remove handwinding wheel D270 with the hub, or handwinding wheel D360 with the locking washer from the shaft.
6. Remove the feather key from the shaft on the D360 handwinding wheel.
7. Release the two headless set screws at the collar of the encoder inner ring (do not remove completely).
8. Unscrew the slotted pan head tapping screw at the bracket of the encoder mount.
9. Remove the cable ties holding back the cables.
10. Pull the encoder off the end of the motor shaft.
11. Check that the technical data of the new encoder matches

Installation

1. Fit the encoder mount (spring plate) of the removed encoder onto the new encoder.

2. Push the new encoder onto the cleaned shaft end of the motor until it makes contact with the shaft collar.
3. The mounting collar must point towards the shaft end.
4. Screw on the encoder mount at the motor.
5. Secure the encoder inner ring by tightening the headless set screw on the motor shaft.
6. Disengage the feather key from the shaft on the D360 handwinding wheel.
7. Push the handwinding wheel with hub onto the shaft end.
8. Push handwinding wheel D270 with the hub, or handwinding wheel D360 with the locking washer onto the shaft.
9. Align handwinding wheel D270 with the hub to the axial pin in the shaft and mount the hub with the handwinding wheel by means of the central screw and disc, then tighten to 75 Nm.
10. Align the D360 handwinding wheel on the feather key and fit together with the disc then tighten to 20 Nm.
11. Secure the connection line to the motor using cable ties.
12. Connect the encoder connection cable to the frequency inverter.

7.12

Checking for grease/oil leakage

⚠ WARNING



Loss of the brake function!

The elevator car can move in an uncontrolled manner through the shaft.

- Make sure the brake drum and other components of the brake are free of grease and oil.
- Rectify the cause of grease/oil leakage.
- Run the brake test.
- Replace the contaminated brake.

NOTICE



Danger when using commercially available brake cleaning agents!

Damage to the brake

- For cleaning work on the brake, only use the cleaning agent isopropanol (isopropyl alcohol). Observe the information provided by the brake manufacturer Appendix.

Degree of contamination	Procedure	
If a small amount of oil/grease leakage is determined	Clean and check regularly within the framework of maintenance	Every 3 months (and/or every 6 months in the case of low frequency of use: fewer than 50,000 runs per year)
If a large amount of oil/grease leakage is determined or brake disc/brake linings are already fouled with oil/grease	Clean the machine and, if necessary, the brake, and repair as quickly as possible. Before continuing operation until modification, run a brake test. If the braking effect is inadequate: Shut down installation. If necessary, check on a daily basis whether oil/grease is still leaking. If this is the case: Shut down installation.	Repair after 4 weeks at the latest

Tab. 19

ATR_00_0004_0

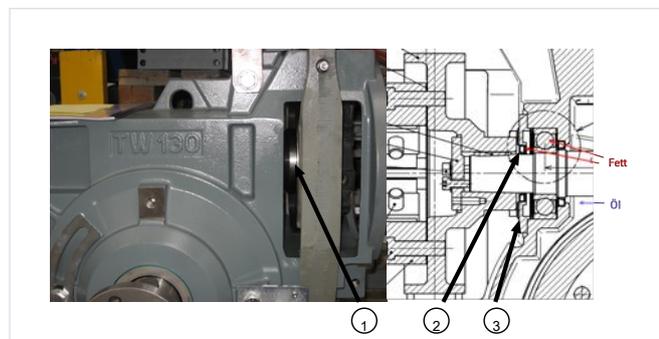


Fig. 47

ATR_2_21_0219_0

Item	Designation	Item	Designation
1	Brake drum	2	Shaft sealing ring
3	Bearing cover		

See manufacturer's instructions [↗ Chap. 10 P. 84](#)

7.13

Check of the brake linkage

The brake linkages could chafe against the cast edge of the brake shoe. In the process, material could be removed and the braking effect impaired. Attention should be paid to ensuring that the brake linkages are "free" and unable to chafe.

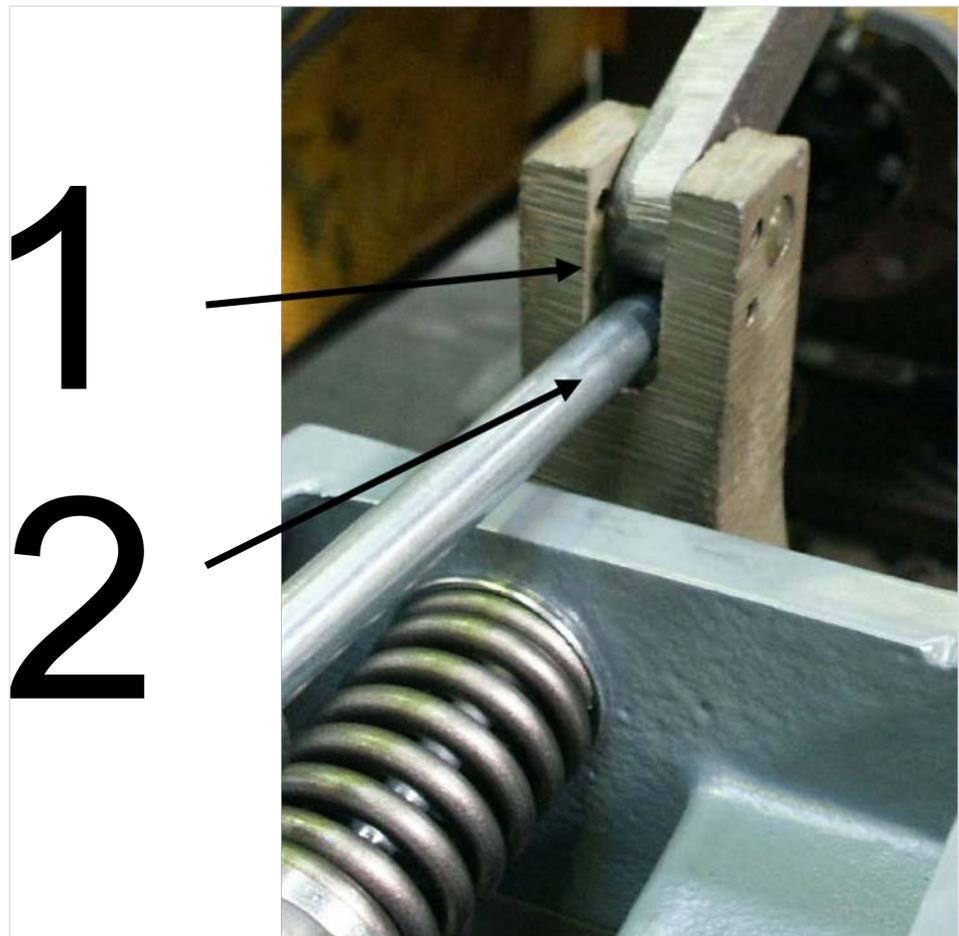


Fig. 48

ATR_2_22_0034_0

Item	Designation	Item	Designation
1	Break the cast edge at the brake shoe (deburr or radius)	2	Examine the brake release rod for traces of chafing; grease if necessary

- If necessary, deburr the cast edge with a file so that there is no longer a sharp edge at this position and the brake linkage cannot get stuck.
 - ▷ If necessary, twist, align or grease the brake linkage.

7.14

Blocking clamp

NOTICE



Blocking clamp not removed.

May lead to impairment or loss of function of the product.

- Remove the blocking clamp after completion of the installation work.

Each machine has a blocking clamp that matches the traction sheave.

Deployment of the blocking clamp

Use the blocking clamp to prevent movements due to slipping ropes during installation work on the elevator car or counterweight or during work where the rope traction of the installation is insufficient (e.g. pulling out of the safety gear).

The blocking clamp should be pre-tensioned by evenly tightening the hexagon nuts so that the ropes are unable to slip.

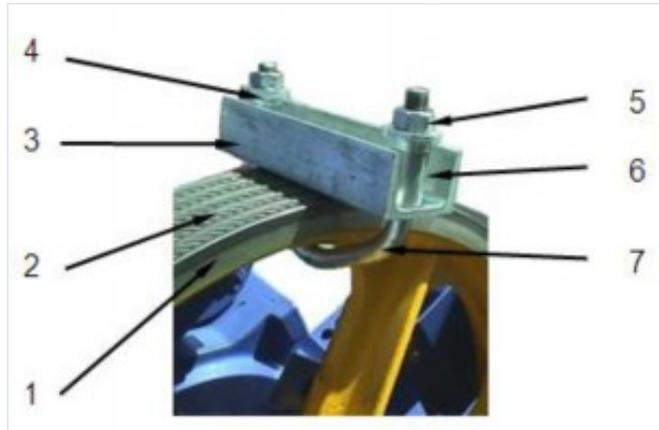


Fig. 49

ATR_2_12_0066_0

Item	Designation	Item	Designation
1	Traction sheave	2	Rope
3	Pressure piece	4	Washer
5	Hexagon nut	6	Spacer sleeve
7	Clamp clip		

7.15

Brake monitoring circuit

Installation

1. If not included in the scope of supply, make two lines of 0.75 mm² for SA3.1 (with PVC sheaths) for direct connection of the switches to the control system.
2. Install both hexagon adjusting screws with counter nuts into the brake shoes.
3. Removal of both transport hangers.
4. Secure the switch to the switch plate using M4 screws, discs and nuts.
5. The switch tappet must be opposite the adjusting screw, but should not make contact with it.
6. Knock out the relevant opening on the switch for the cable gland and install the cable gland.
7. Connect the cable to the switch.

Terminal connecting plan for brake test switch SA 3.1

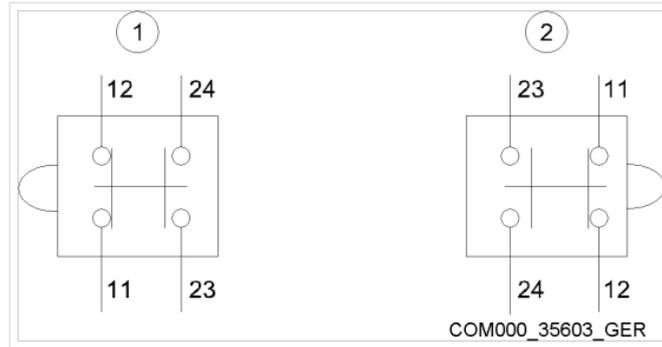


Fig. 50

ATR_2_22_0042_0

Item	Designation	Item	Designation
1	Button for brake circuit 1	2	Button for brake circuit 2

Setting SA3.1 for monitoring the brake release with wear detection

The break contact with contacts 11 and 12 is used to monitor the position of the brake shoes. With the brake open, the switch is closed. The make contact only closes contacts 23/24 when the wear limit of the brake linings has been reached and the brake is closed. The contacts must be switched in such a way that, when one contact for both switches is closed, the drive is prevented from starting up. With correctly set brake test switches, all switch contacts must be interrupted with a closed brake. Before starting to set the switch, the stroke of the brake shoes must be adjusted.

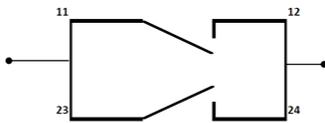


Fig. 51

ATR_2_22_0058_0

1. Switch on emergency operation switch and elevator control unit.
2. Connect the continuity test device to contacts 23–24.
3. Adjust the adjusting screw towards the switch until the continuity test device indicates continuity of 23–24.
4. Turn the screw back slowly until the continuity test device no longer indicates continuity of 23–24.
5. Move the adjusting screw by $\frac{1}{4}$ turn (corresponds to approx. 0.3 mm) in the direction of the switch and secure.
6. Continuity test device indicates constant continuity of 23–24.
7. Continue unscrewing the adjusting screw a further approx. $\frac{1}{4}$ revolution.
8. Open and close the brakes by switching the motor
9. Check the switch change at the switches between the opened and closed brake.
10. Perform the setting on both switches in the same way.

Setting SA3.1 for monitoring the brake release without wear detection

Before starting to set the switch, the stroke of the brake shoes must be adjusted.

1. Connect the continuity test device to contacts 11 and 12 of the break contact. The adjusting screw must not touch the switch tappet.

2. In the drive's home position (brake magnet without current), unscrew the adjusting screw for the brake test from the brake shoe in the direction of the switch tappet until opening of the contact is indicated by a signal interruption at the continuity test device.
3. Continue unscrewing the adjusting screw a further approx. 1/4 revolution.
4. Secure the setting by tightening the counter nuts.
5. Repeat the setting procedure at the second brake test switch.

Checking the setting

Open and close the brakes by switching the motor. In doing so, observe whether the switch change at the contacts corresponds to the procedure described above. Push the feeler gauge between the adjusting screw and the switch tappet. Select the thickness of the feeler so that contact 23/24 is closed. If one of the contacts is closed, the drive must not be activated.

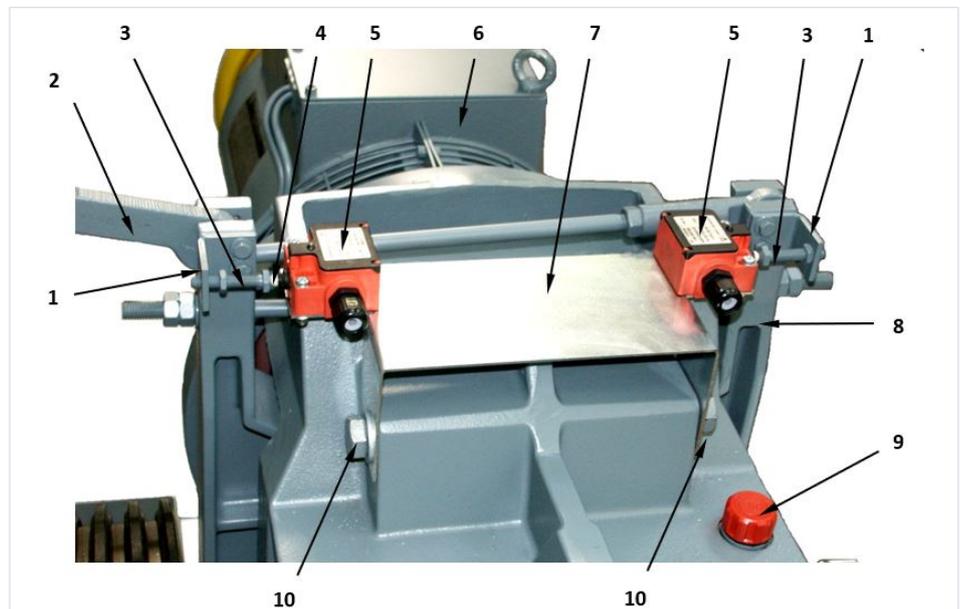


Fig. 52

ATR_2_21_0221_0

Item	Designation	Item	Designation
1	Mounting elbow	2	Brake release lever
3	Adjusting screw and counter nut	4	Switch tappet
5	Switch SA3.1	6	Motor terminal box
7	Switch plate SA3.1	8	Brake shoes
9	Oil fill/ventilation opening	10	Fastening screws

Switch mounting and setting for SA15 (full Ex)



Fig. 53

ATR_2_22_0043_0

Item	Designation	Item	Designation
1	Button for brake circuit 1	2	Button for brake circuit 2

- Operation: Monitoring of the brake release **without** wear monitoring of the brake lining

Only contacts 23–24 are used for this function.

The break contact with contacts 23–24 is used to monitor the position of the brake shoe. With the brake open, the switch is also open.

- Operation: Monitoring of the brake release **and** wear monitoring of the brake lining

The break contact with contacts 11–12 is used to monitor the position of the brake shoe. With the brake open, the switch is closed. The make contact only closes contacts 23–24 when the wear limit of the brake linings has been reached and the brake is closed. The contacts must be switched in such a way that, when one contact for both switches is closed, the drive is prevented from starting up. With correctly set brake test switches, all switch contacts must be interrupted with a closed brake.

Circuitry of the contacts:

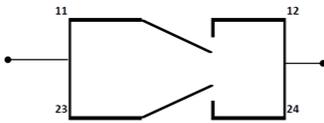


Fig. 54

ATR_2_22_0058_0

8 Commissioning

8.1 Work steps

Check the following points:

1. Check the machine, traction sheave and base frame.
2. Check the rope guard.
3. Check the distance to the traction sheave.
4. Check the setup of the machine, base frame, pedestal and rope departure.
5. With a side or oblique rope departure, secure the gear box casing against moving using steady plates and set screws.
6. Tighten the screws to the required torque [↗ Chap. 10.1 P. 84](#).
7. Check the oil level.
8. Check the installation of the filling and/or ventilation screw.
9. Check the power connections and grounding at the motor.
10. Check the connection of the magnetic clamp and the brake test switch.
11. Check the connection values (voltage, frequency) against the manufacturer specifications.
12. Check the function of the monitoring devices (encoder, thermal element).
13. Check the parking brake and emergency brake NBS (if present).
14. Check the brake function.
15. Attach the direction arrow (up/down) according to the direction of travel and clearly visible on the motor near the handwinding wheel.
16. Remove safety, auxiliary and installation tools from the danger zone.



For assembly and repair, use only original parts from TK Aufzugswerke GmbH, as otherwise no warranty can be provided.

8.2 Emergency operation

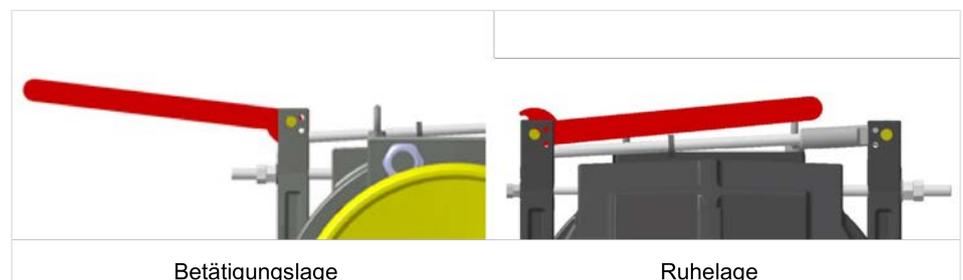


Fig. 55

ATR_2_22_0023_0

On the version with vertical motor position, the brake release lever is additionally secured in the rest position with a retaining clip.

Emergency rescue of trapped persons

⚠ CAUTION**Rapid movement of the elevator car!**

Abrasion injuries.

- Only use the handwinding wheel for assembly and maintenance purposes with a safe stance.
- In the event of uncontrolled elevator car movement, let go of the handwinding wheel immediately.

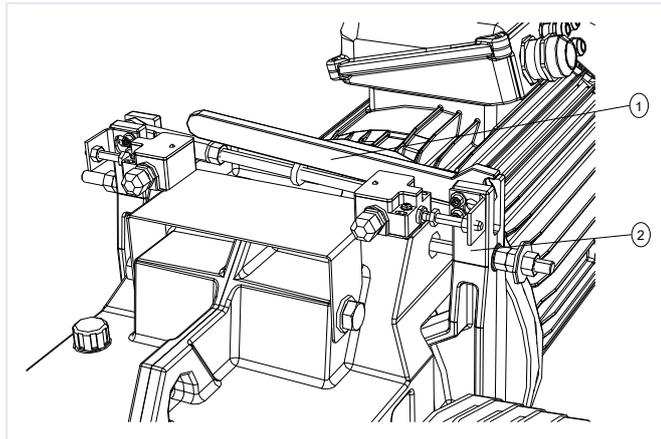


Fig. 56

ATR_2_12_0143_0

Item	Designation	Item	Designation
1	Pivot the brake release lever to open the brake	2	Brake shoes

1. To open the brake, check that the brake release lever is in the direction of the motor.
2. The handwinding wheel might also have to be moved to bring the elevator car into the nearest landing.
3. Depending on the load, the elevator car can begin to move quickly after opening the brake.
4. Immediately let go of the handwinding wheel and control the speed of the elevator car by pressing the brake release lever with varying degrees of force.
5. Following the rescue operation, put the brake release lever back in the rest position.

Drive with emergency brake (NBS)

i

Mounting the emergency brake, NBS, fundamentally changes the procedure and sequence for emergency operation. Comply with the separate NBS operating manual. The operating manual for drives with emergency brake system equipment is delivered separately. [↗ Emergency brake system, NBS.](#)

9 Maintenance

9.1 Maintenance

Measurements must be taken annually:

1. Check the oil level; top up if necessary.
2. Change the oil at the prescribed intervals.
3. Check the gear and bearings for leakage
4. Check the brake setting of the shoe stroke.
5. Check the brake function
6. Check the braking deceleration
7. Check the worm gear toothing for wear
8. Check the groove profile on the traction sheave for damage and wear
9. Check that the screws of the traction sheave mount are securely seated
10. With the drive on the machine base frame, check the mounting of the machine, supports and rope pulley carriers.
11. Check the rope pulley grooves for damage and wear.
12. Check that the electrical connections are in proper and adequate condition, and check that they are securely attached.
13. Check that protective and safety devices are present and correctly set.
14. Check the seals at the shaft in the area of the brake and at the bearing for grease and/or oil leakage.

9.2 Standstill maintenance

Standstill maintenance must be carried out on stored machines that have been at a standstill for over a year.

Standstill maintenance must be carried out on stored machines that have been at a standstill for over a year. Release the operational brake by means of the brake release lever and (if available) release the emergency brake manually via the emergency release screws.

The traction sheave is rotated (clockwise and anticlockwise) via a handwinding wheel on motor 3.

Depending on the storage conditions, replace the corrosion protection of the bare parts (for example with Rivolta KSP 317 corrosion protection wax).

9.3 Maintenance instructions

- Oil change: After 4 years for the first time, then every 8 years
- Greasing: Re-lubrication of outside bearing on SA9 annually
- Other components: Maintenance free

10 Appendix

10.1 Tightening torques

DANGER



Insecure threaded connection.

Death or severe physical injury due to parts coming loose.

- When working on the machine or replacing parts, care must be taken to ensure that the prescribed bolt/screw strength and tightening torques are complied with.
- Only use suitable tools (torque wrench).

The values listed below apply to screwed connections with **regular threads** (not fine threads):

- Slotted pan head tapping screws DIN 912 ISO 4762
- Hexagon head bolts DIN 931/933 ISO 4014/4017
- These specifications do not apply to microencapsulated bolts/nuts. The specifications of the manufacturer apply here.



If other tightening torques are specified in the drawings or elsewhere in the document for each screw size, these are to be complied with.

Tightness	8.8	10.9	12.9
Screw/bolt size	Tightening torque [Nm]		
M4	2.6	-	-
M5	5.3	-	-
M6	9.0	12	15
M8	20	30	35
M10	40	60	75
M12	75	105	130
M14	120	170	205
M16	190	265	320
M20	370	520	620
M24	640	900	1080
M30	1300	1800	2150

Tab. 20

ASY_1_00_0001_0

10.2 Manufacturer information

Also see about this

➤ [Verification of traction sheave calculation P. 86](#)

- ↗ Verification of traction sheave shaft calculation SA4 / SA9 P. 87
- ↗ SKINTOP MS-SC Mounting instructions P. 88
- ↗ Wachendorff encoder WDG100H--xx-yyyy-ABN-I05-K3-D56 - assembly instructions P. 89
- ↗ Encoder Wachendorf WDG 100H-38-1024-AB-R05-K3-J66-100 P. 90
- ↗ Wachendorff WDG encoder 100H-XX-YYYY-ABN-I05-K3-D56 P. 91
- ↗ Centaflex P. 92
- ↗ Bernstein data sheet BI2-U1ZW 6085103100 P. 94
- ↗ Bernstein 6085103100_Bi2 P. 96

Certificate concerning the examination of traction sheave shaft calculation including shaft to collar connections

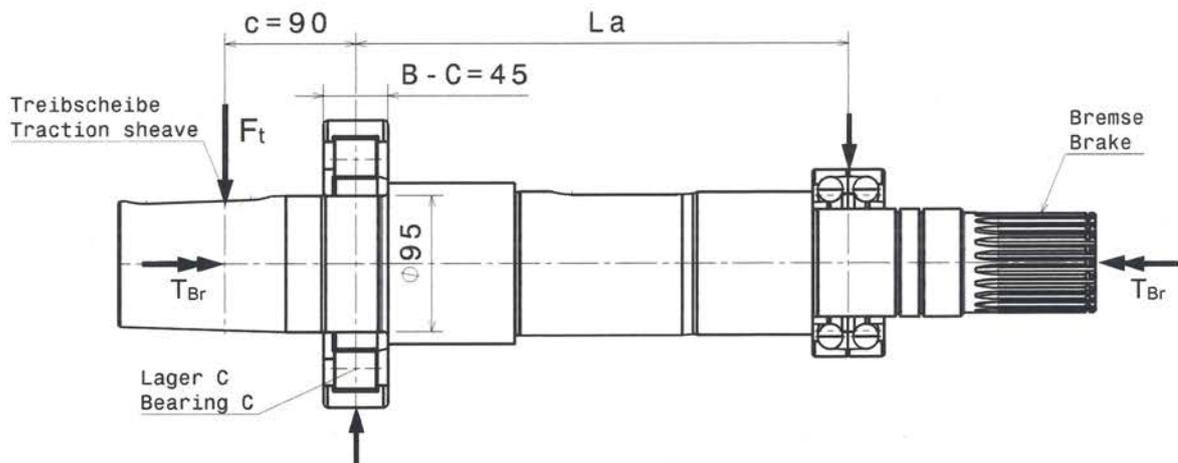
Lift machine, type: TW130

Brake type: RSO 1300 - 4000Nm
according EC-Type Examination EU-BD 891/X

Manufacturer: TK Aufzugswerke GmbH
Bernhäuser Str.45, 73765 Neuhausen a.d.F.

Object examined: Calculation of traction sheave shaft including shaft to collar connections

Examination basis: DIN743, machine elements Niemann/Winter/Höhn (2005)



Design drawing: 6233 000 9229

Material: 42CrMoS4+QT (1.7227) or 42CrMo4+QT (1.7225)

Load data:

Machine	Max. shaft load F_t	Nominal brake torque T_{Br}	Max. brake torque $1.6 \times T_{Br}$	Distance traction sheave C	Bearing distance L_a
	(kN)	(Nm)	(Nm)	(mm)	(mm)
TW130	70	4000	6400	90	340

Examination result:

For the examination calculations were carried out based on the examination basis. The result was that the traction sheave shaft and the shaft to collar connections were designed according the maximum load data. The remarks in the maintenance instructions are to be observed.

The conditions mentioned in annex of the EC-Type-Examination Certificate EU-BD 891/X are herewith fulfilled


 (Head of PDC Neuhausen, TKE IaO)


 (Cluster Lead TM, TKE IaO)

Certificate concerning the examination of traction sheave shaft calculation including shaft to collar connections

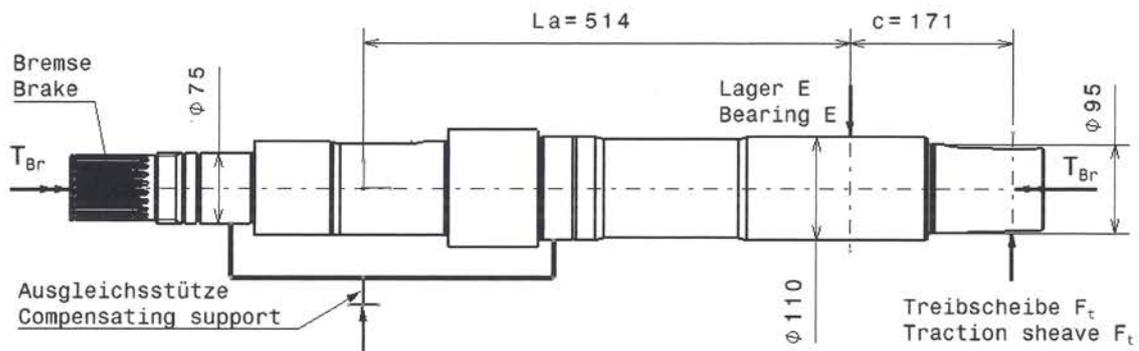
Lift machine, type: TW130 (special version SA4 / SA9)

Brake type: RSO 1300 - 4000Nm
according EC-Type Examination EU-BD 891/X

Manufacturer: TK Aufzugswerke GmbH
Bernhäuser Str.45, 73765 Neuhausen a.d.F.

Object examined: Calculation of traction sheave shaft including shaft to collar connections

Examination basis: DIN743, machine elements Niemann/Winter/Höhn (2005)



Design drawing: 6233 000 9295

Material: 42CrMoS4+QT (1.7227) or 42CrMo4+QT (1.7225)

Load data:

Machine	Max. shaft load F_t	Nominal brake torque T_{Br}	Max. brake torque $1.6 \times T_{Br}$	Distance traction sheave C	Bearing distance La
	(kN)	(Nm)	(Nm)	(mm)	(mm)
TW130 (SA4/SA9)	65	4000	6400	171	514

Examination result:

For the examination calculations were carried out based on the examination basis.

The result was that the traction sheave shaft and the shaft to collar connections were designed according the maximum load data. The remarks in the maintenance instructions are to be observed.

The conditions mentioned in annex of the EC-Type-Examination Certificate EU-BD 891/X are herewith fulfilled


.....
(Head of PDC Neuhausen, TKE IaO)


.....
(Cluster Lead TM, TKE IaO)

U.I.LAPP GmbH
 Schulze-Delitzsch-Straße 25
 D-70565 Stuttgart
 Tel.0711/7838-1010
 Fax.0711/7838-2640
 Internet:www.lappkabel.de

GEBRAUCHSANWEISUNG INSTRUCTION SHEET

SKINTOP® MS-M, MSR-M, MS-M-XL, MSR-M-XL
 MS-SC-M, MS-SC-M-XL

Bezeichnung Product		Klemm- und Dichtbereich Clamping and Sealing range					Approbationen Approvals	
		EN 50262		UL 514 B				
Größe/Size M		Kat.der Zug- entlastung	Anzugsdreh- momente Nm	Klemm- bereich Ø mm	Diameter inch	Ø mm		
12x1,5	MS-M, MS-M-XL	A	8	3,5 - 7	.12 - .27	3,5 - 7		
	MSR-M, MSR-M-XL			3,5 - 5	.04 - .20	1 - 5		
	MS-SC-M, MS-SC-M-XL			3,5 - 7	.12 - .27	3,5 - 7		
16x1,5	MS-M, MS-M-XL	A	10	4,5 - 10	.17 - .35	4,5 - 10		
	MSR-M, MSR-M-XL			3,5 - 7	.08 - .27	2 - 7		
	MS-SC-M, MS-SC-M-XL			4,5 - 9	.17 - .35	4,5 - 9		
20x1,5	MS-M, MS-M-XL	A	12	7 - 13	.27 - .51	7 - 13		
	MSR-M, MSR-M-XL			5 - 10	.20 - .04	5 - 10		
	MS-SC-M, MS-SC-M-XL			7 - 12,5	.27 - .49	7 - 12,5		
25x1,5	MS-M, MS-M-XL	A	12	9 - 17	.35 - .65	9 - 17		
	MSR-M, MSR-M-XL			6 - 13	.23 - .51	6 - 13		
	MS-SC-M, MS-SC-M-XL			9 - 16,5	.35 - .65	9 - 16,5		
32x1,5	MS-M, MS-M-XL	A	18	11 - 21	.43 - .83	11 - 21		
	MSR-M, MSR-M-XL			7 - 15	.27 - .59	7 - 15		
	MS-SC-M, MS-SC-M-XL			11 - 21	.43 - .83	11 - 21		
40x1,5	MS-M, MS-M-XL	A	18	19 - 28	.75 - 1.1	19 - 28		
	MSR-M, MSR-M-XL			15 - 23	.59 - .9	15 - 23		
	MS-SC-M, MS-SC-M-XL			19 - 28	.75 - 1.1	19 - 28		
50x1,5	MS-M, MS-M-XL	A	20	27 - 35	1.06 - 1.38	27 - 35		
	MSR-M, MSR-M-XL			22 - 29	.87 - 1.14	22 - 29		
	MS-SC-M, MS-SC-M-XL			27 - 35	1.06 - 1.38	27 - 35		
63x1,5	MS-M	A	20	34 - 45	1.34 - 1.77	34 - 45		
	MSR-M			28 - 39	1.1 - 1.53	28 - 39		

Bemerkungen/ Remarks

- SKINTOP ins Gehäuse schrauben oder mit Gegenmutter festziehen
Screw SKINTOP into housing or tighten with locknut
- Leitung durchziehen
Put cable through
- Hutmutter mit empfohlenem Drehmoment festziehen
Tighten nut with recommended tightening torque

Schutzart:

IP 68; 5bar/30min.nach EN 60 529
 IP 69K nach DIN 40 050

Ohne Gegenmutter:
 NUR IN GEWINDEBOHRUNGEN
 VERWENDEN!

*Usage without Locknut:
 ONLY IN THREADED
 HUB!*

1 inch = 25,4mm
 Temperaturbereich: -25 bis +100°C
 Temperature range: -25 up to +100°C

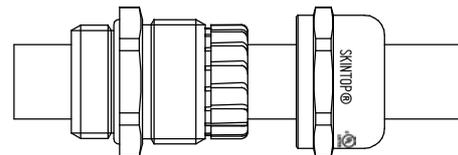
UL File No. E 79903, Control Number 54 B 2

Hinweis / Note:

Sollte der Inhalt dieser Verpackung auf neue Verpackungen verteilt werden, so muss jeder neuen Verpackung eine Kopie dieser Betriebsanleitung beigelegt werden.
If the content of this bag will be split on two or more units, a copy of this instruction sheet must be placed in every packing units.

Art.Nr. 91100008

BS 04/2889-5



Druckfarbe: schwarz, Papierfarbe: hellgelb "CARNEVAL" 80g/qm (igepa Art.Nr.323-31)

Größe angepasst auf DIN A5, Falzung Kreuzbruch, Druck aussen

Toleranzen / tolerances: DIN		Werkstoff / material: Papier		Oberfläche / surface		Gewicht / weight:		Volumen / volume:		Farbe / color:	
Bearb. edited	Datum / date 27.05.04	Name / name M. Schmid	Geprüft checked	Datum / date 23.04.08	Name / name D.Müller	Maßangaben in dimension units mm					
Projektion / projection: 		Maßstab / scale: 1:1		Benennung / name: SKINTOP MS-M Beipackzettel SKINTOP MS-M operating instuction							
05	500000001032	Mast1	26.03.2009			Zeichnungs-Nr. / drawing no.: BS04_2889		Blatt sheet: 1/1		Dok. Art doc. type LBZ DIN A 4	
Ind. vs	Änderungs-Nr. change number	Datum / date Bearb./edited		Gepr./check.		Ersatz für / substitute for: BS04_2889-3					

Copyrights according to DIN ISO 16016
 This drawing has to be changed by CAD only

Urheberschutz nach DIN ISO 16016
 Diese Zeichnung darf nur mittels CAD geändert werden.

Montageanleitung Hohlwellengeber, D56

Assembly instructions hollowshaft encoder, Notice de montage codeur rotatif à arbre creux, Instrucciones de montaje encoder ad albero cavo, istruzioni di montaggio encoders de eje hueco

Operating temperature: -30 °C ... +80 °C (-22 °F ... +176 °F)
Storage temperature: -20 °C ... +70 °C (-4 °F ... +158 °F)

Montage nur qualifiziertes Personal
 Assembly only qualified personnel
 Montage par qualifié personnel
 Montaje solamente personal calificado
 Montaggio solo personal qualificato

DIN EN 100015-1

Kabel ø cable, Câble, Cable, cavo	R1	R2	Temperatur Temperature, Température, Temperatura, Temperatura
6,3 mm	31,5 mm	94,5 mm	T > -20 °C (-4 °F)
8,3 mm	41,5 mm	124,5 mm	T > -20 °C (-4 °F)

	Kabel, cable, Câble, Cable, cavo
	SUBD9 9-pin
	K3
Minus U-	7
Plus U+	9
A	2
B	3
N	5
A inv.	1
B inv.	4
N inv.	6
n. c.	-

Steckergehäuse/Schirm mit Gebergehäuse leitend verbunden
 Connector housing/shield electrically connected to encoder housing
 Bâtier de connexion/Ecran avec boîtier d'ementeur liés de manière conductrice
 Caja de conector/Pantalls conectada en conductancia con caja de transmisor
 scatola prese/Schemo con scatola trasmettitore collegata da condurre

WH: weiss, white, blanc, bianco
BN: braun, brown, brun, marrón, marrone
GN: grün, green, vert, verde, verde
YE: gelb, yellow, jaune, amarillo, giallo
GY: grau, grey, gris, gris, grigio
PK: rosa, pink, rose, rosa, rosso
RD: rot, red, rouge, rojo, rosso
BK: schwarz, black, noir, negro, nero
BL: blau, blue, bleu, azul, blu
VT: violett, violet, violet, violeta, violetto
Litze: Litze, Flex, Toron, Cordon, Cavetto

100H

d/mm	WDG 100H
25,25.4,28,30,38,40,42,45	

$\frac{t_L}{T} = \frac{t_H}{T} = 50\% \pm 4,2\% *$

$360^\circ \text{el} = \frac{360^\circ \text{mech}}{n \text{ Imp.}}$

alle % bezogen auf 360°el
 all % refer to 360°el
 tous les % se réfèrent à 360°el
 todos los % se refieren a 360°el
 tutta la % riferita a 360°el

	Vcc	I _{supply}	Output TTL / RS422	I _{OUT,max}
G05, H05, I05, R05	4,75...5,5VDC	≤70mA	V _H >2,5V _{DC} V _L <0,5V _{DC}	40mA
Bemerkungen Remarks Notas Observaciones osservazioni			Ohne Last Without load resistance Sans charge Sin carga Senza carico	Pro Kanal Per channel Par canal Por canal Per canale

Abstand zu Störquellen!
 Distance to sources of interference!
 Distance aux source des parasites!
 Distancia a las fuentes de interferencias!
 Distanza dalle fonti di disturbo!

$L \leq L_{MAX}$

***Nur, only, seulement, solamente, soltanto G24, H24, I24, R24, 245:**
 hat Verpolschutz, ist kurzschlussfest;
 Protection against polarity reversal, short circuit protection;
 Protecion contro l'inversion de polarité, Protection court-circuit;
 Protegido contra inversion de polaridad,protección contra cortocircuito;
 protezione contro inversione di polarità, protezione contro corto circuito

Technical Support
 Germany:
 Tel.: +49 (0) 67 22 / 99 65 131
 Fax: +49 (0) 67 22 / 99 65 70
 email: support-wdgi@wachendorff.de

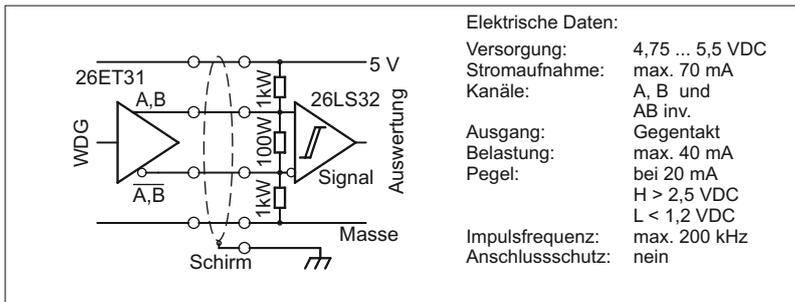
Other countries, please contact your distributor.
 Autres pays, veuillez contacter votre distributeur.
 Otros países, rogamos contacten a su distribuidor.
 Per gli altri paesi si prega di contattare il vostro distributore.

Hohlwellen - Drehgeber WDG 100H

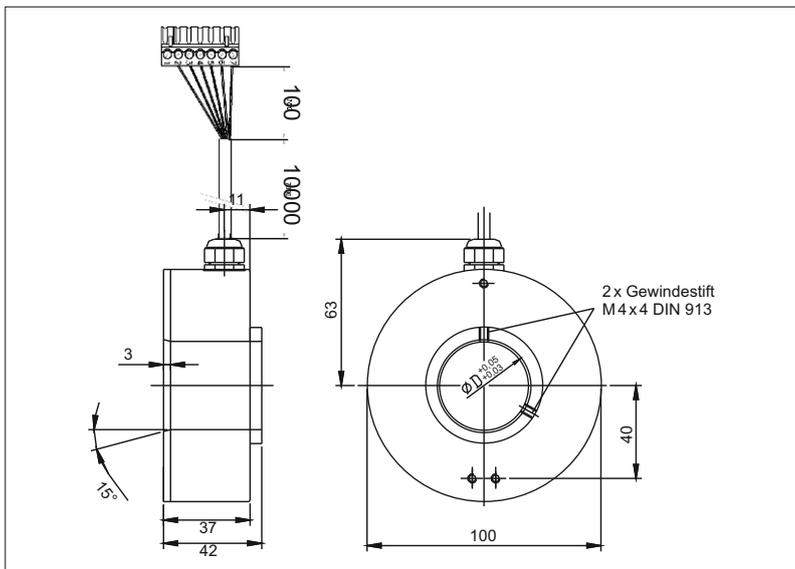
Bestell-Nr.: WDG 100H-38-1024-AB-R05-K3-J66-100

 Empfohlene Wellenanpassung:
 für Hohlwellendurchmesser 38mm: 38m6 (k6, j6)
 Max. Rundlaufabweichung der Antriebswelle: 0,05 mm

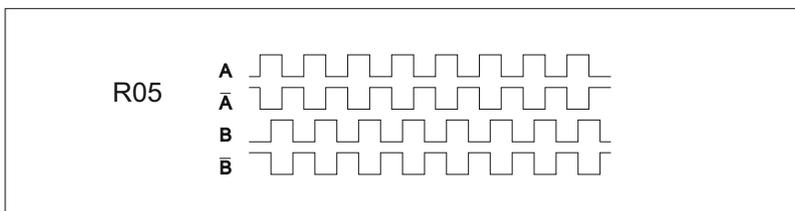
Thyssen-Sachnummer: 9950 001 1304



Ausgangsschaltung 5 VDC: R05



Maßzeichnung WDG 100 H, Angaben in mm



Impulsfolge bei Blick auf Nabe, Drehung im Uhrzeigersinn.

Spezifikationen
Mechanische Daten
Gehäuse

- Flansch: Aluminium
- Rückseite: Aluminium
- Durchmesser: 100 mm
- Tiefe: 42 mm
- Befestigung: über Hohlwelle mit 2 Gewindestiften M4

Hohlwelle

- Material: Edelstahl
- Durchmesser: 38 mm
- Belastung am Wellenende: max. 200 N radial
max. 100 N axial
- Anlaufmoment: 1,5 Ncm
- Befestigung: 2 x M4, DIN 913

Lager

- Typ: 2 Präzisionskugellager
- Lebensdauer: 3 x 10¹⁰ U bei 100% Lagerlast

- 4 x 10¹¹ U bei 40%
- 3 x 10¹² U bei 20%

max. 3.500 U/min

ca. 720 g

Anschluss: radialer Kabelabgang mit 10m Kabel und konfektionierter, 7-pol. Phönixklemme

Elektrische Daten

 Allgemeine Auslegung: gem. DIN VDE 0160
 Versorgung/Ausgänge: ® Ausgangsschaltung
 Kabellänge: max. 100 m

Optik

 Lichtquelle: IR - LED
 Lebensdauer: typ. 100.000 Std.
 Abtastung: differentiell

Genauigkeit

in % einer Periodendauer des Signals A

Phasenversatz: 90° ± 7,5%

Impuls-/Pausen - verhältnis: 50% ± 7%

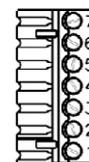
Umwelt - Daten

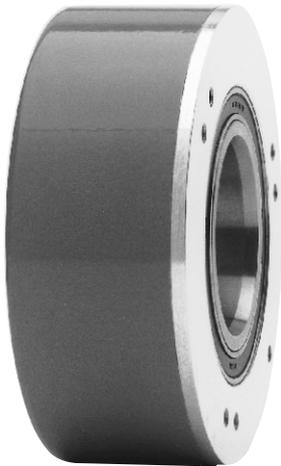
bei geerdetem Gehäuse und gegen im Eingebauten Zustand berührbare Teile.

- ESD (EN 61000-4-2): 8 kV
- Burst (EN 61000-4-4): 2 kV
- Schutzart (EN 60529): IP 54
- Vibration (IEC 68-2-6): 50m/s² (10-2000 Hz)
- Stoß (IEC 60068-2-27): 1000m/s² (6 ms)
- Arbeitstemperatur: -20 - +80°C
- Lagertemperatur: -30 - +80°C

Steckerbelegung
Funktion Pin Farbe

- Minus 6 weiß
- Plus 7 braun
- A 5 grün
- A inv. 4 grau
- B 3 gelb
- B inv. 2 rosa
- Schirm 6 Litze

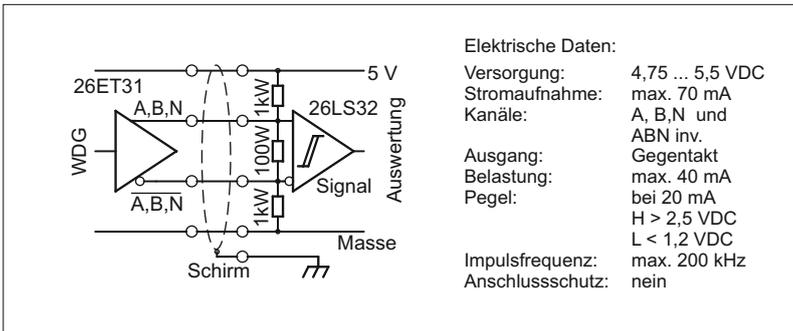


Hohlwellen - Drehgeber WDG 100H

Bestell-Nr.: WDG 100H-XX-YYYY-ABN-I05-K3-D56

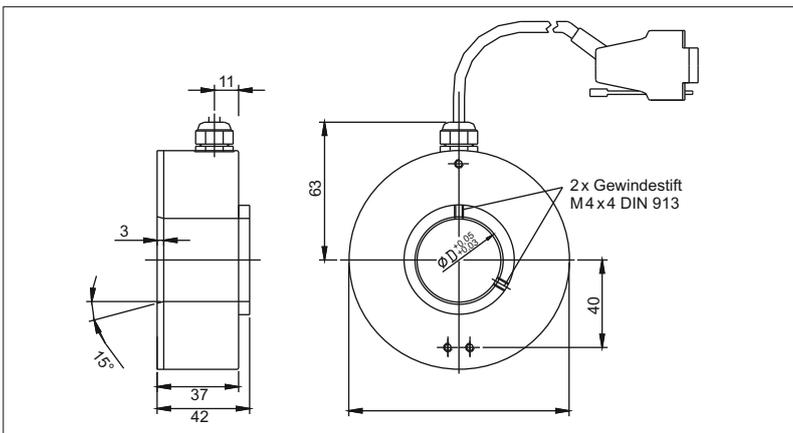
YYYY = Impulszahl = 1024, 2048, 4096
 XX = Hohlwellendurchmesser: 30, 38 mm

Empfohlene Wellenanpassung:
 für Hohlwellendurchmesser D (XX) = 38: 38m6 (k6, j6)
 für Hohlwellendurchmesser D (XX) = 30: 30m6 (k6, j6)
 Max. Rundlaufabweichung der Antriebswelle: 0,05 mm

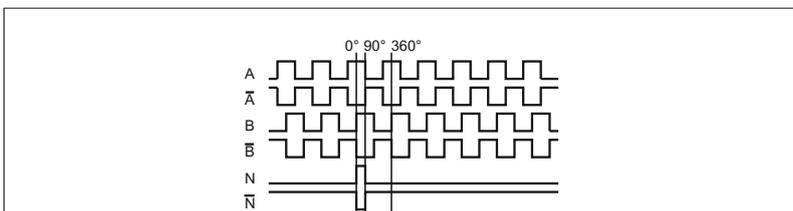
Thyssen-Sachnummer: 9950 000 6021 für 1024 Striche
 9950 000 6022 für 4096 Striche



Ausgangsschaltung 5 VDC: I05



Maßzeichnung WDG 100 H, Angaben in mm



Impulsfolge bei Blick auf Nabe, Drehung im Uhrzeigersinn.

Spezifikationen
Mechanische Daten
Gehäuse

- Flansch: Aluminium
- Rückseite: Aluminium
- Durchmesser: 100 mm
- Tiefe: 42 mm
- Befestigung: über Hohlwelle mit 2 Gewindestiften M4

Hohlwelle

- Material: Edelstahl
- Durchmesser: 30, 38 mm
- Belastung am Wellenende: max. 200 N radial, max. 100 N axial
- Anlaufmoment: 1,5 Ncm
- Befestigung: 2 x M4, DIN 913

Lager

- Typ: 2 Präzisionskugellager
- Lebensdauer: 3 x 10¹⁰ U bei 100% Lagerlast, 4 x 10¹¹ U bei 40%, 3 x 10¹² U bei 20% max. 3.500 U/min

Drehzahl:

- Gewicht: ca. 720 g
- Anschluss: radialer Kabelabgang mit 10m Kabel und konfektioniertem, metallisiertem 9-pol. SubD-Stecker mit Rändelschraube UNC 4-40

Elektrische Daten

- Allgemeine Auslegung: gem. DIN VDE 0160
- Versorgung/Ausgänge: ® Ausgangsschaltung
- Kabellänge: max. 100 m

Optik

- Lichtquelle: IR - LED
- Lebensdauer: typ. 100.000 Std.
- Abtastung: differentiell

Genauigkeit

in % einer Periodendauer des Signals A

- Phasenversatz: 90° ± 4,2%
- Impuls-/Pausen - verhältnis: 50% ± 4,2%

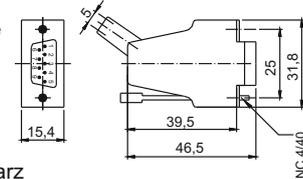
Umwelt - Daten

bei geerdetem Gehäuse und gegen im Eingebauten Zustand berührbare Teile.

- ESD (EN 61000-4-2): 8 kV
- Burst (EN 61000-4-4): 2 kV
- Schutzart (EN 60529): IP 54
- Vibration (IEC 68-2-6): 50m/s² (10-2000 Hz)
- Stoß (IEC 60068-2-27): 1000m/s² (6 ms)
- Arbeitstemperatur: -20 - +80°C
- Lagertemperatur: -30 - +80°C

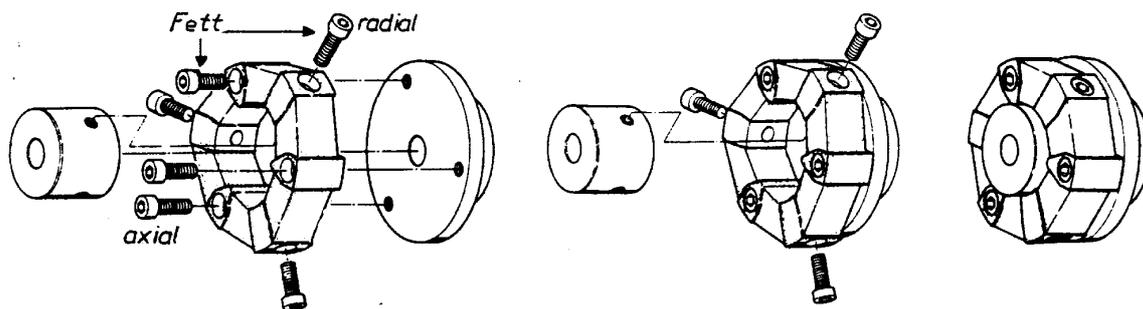
Steckerbelegung

Funktion	Pin	Farbe
Minus	7	weiß
Plus	9	braun
A	2	grün
A inv.	1	rot
B	3	gelb
B inv.	4	schwarz
N	5	grau
N inv.	6	violett
Schirm	8	Litze + Gebergehäuse + Steckergehäuse



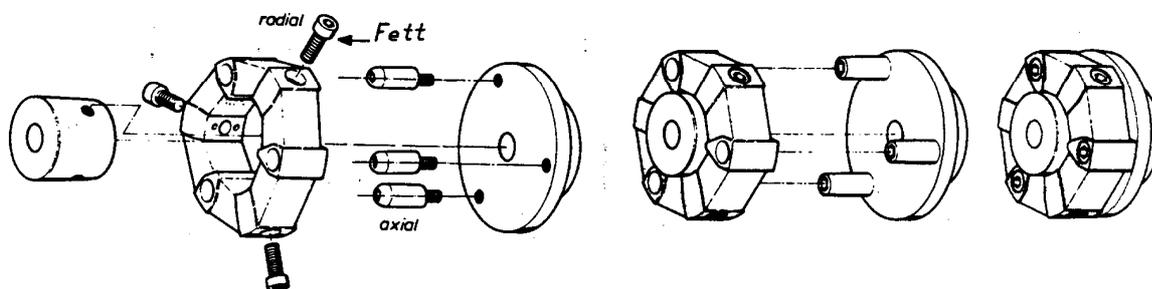
Montageanleitung für Centaflex-Kupplungen Type A

a) Normalbauform



- 1.) Naben auf Wellen bzw. Anschlußflansche an Schwungräder montieren
- 2.) Gummitteil zuerst mit Achsialschrauben an Flanschnabe, bzw. Flanschplatte, bzw. Schwungrad montieren
- 3.) Auf Welle montierte zylindrische Nabe heranschieben und dann das Gummielment mit radialen Schrauben darauf befestigen. Dabei wird das Gummielment radial zusammengezogen und erhält eine Druckvorspannung zur Erhöhung der Leistung.

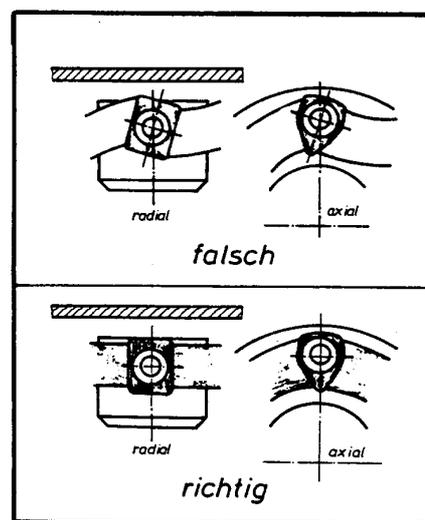
b) Bauform "S" (steckbar)



- 1.) Naben auf Wellen bzw. Anschlußflansche an Schwungräder montieren
- 2.) Achsiale Steckbolzen an Flanschnabe bzw. Flanschplatte bzw. Schwungrad montieren
- 3.) Gummitteil mit radialen Schrauben auf zylindrische Nabe montieren. Dabei wird das Gummielment radial zusammengezogen und erhält eine Druckvorspannung. Danach die gekuppelten Aggregate zusammenschieben und dabei die Kupplung auf die Steckbolzen mit leichtem axialem Druck vorsichtig aufschieben. Dabei wird das Gummielment durch die Steckbolzen noch etwas mehr radial zusammengedrückt und die Druckvorspannung wird erhöht. Zuvor die axialen Bohrungen im Gummielment gut einfetten, damit die Steckbolzen besser gleiten.

Wichtige Hinweise, unbedingt beachten!

- a) Schraubenlänge! Bei Bauform "S" und Gelenkwelle Bauform "GZ" sind die axialen Schrauben länger als die radialen Schrauben. Die kürzeren Schrauben also immer nur für die radiale Verschraubung mit zylindrischer Nabe bzw. Rohr (bei GZ) benutzen.
- b) Darauf achten, daß beim Anziehen der Schrauben die Alubuchsen im Gummitteil nicht mit verdreht werden, sondern gerade sitzen. Daher zur Verringerung der Reibung zwischen Schraubenkopf und Aluteil unbedingt eine kleine Menge Fett vor der Montage unter den Kopf der Schraube geben. Nötigenfalls durch Gegen-druck mit geeignetem Werkzeug ein Verdrehen (Schiefstellen) des Gummitteils beim Anziehen der Schrauben verhindern. Dieser Punkt ist besonders wichtig bei den radialen Schrauben, sonst tragen die zylindrischen Flächen zwischen Aluteil und Nabe nicht richtig vollflächig, sondern nur auf 2 Ecken. In diesem Falle erfolgt unweigerlich ein Lockern der Schrauben und nachfolgend die Zerstörung der Kupplung. Bei den Kupplungstypen, die in der zylindrischen Nabe Stifte aufweisen ergibt sich die richtige Position der radialen Aluteile automatisch. Falls die Kupplung bei Lieferung schon vormontiert ist, sollte sie keinesfalls mehr demontiert werden, sondern in diesem Zustand eingebaut werden.
- c) Die Schrauben, die das Gummielment mit der Nabe verbinden, müssen unbedingt alle (axial und radial) mit dem Drehmomentschlüssel auf das in der folgenden Tabelle angegebene Drehmoment angezogen werden. Das Anziehen mit Drehmomentschlüssel ist besonders wichtig bei den größeren Typen. Anziehen "nach Gefühl" genügt keinesfalls, da in diesem Falle erfahrungsgemäß die Anziehdrehmomente viel zu niedrig sind. Zu geringe Anziehdrehmomente führen unweigerlich zum Lösen der Schrauben und damit zur Zerstörung der Kupplung.



Centaflex Größe	1	2	4	8 / 12	16 / 22	25 / 28	30	50 / 80	90	140	200	250
Schraube DIN 912	M 6	M 8	M 8	M 10	M 12	M 14	M 16	M 16	M 20	M 20	M 20	M 20
Anzugsmoment Nm	10	25	25	50	85	140	220	220	500	500	500	500
mKp	1,0	2,5	2,5	5	8,5	14	22	22	50	50	50	50

d) Nur die mitgelieferten Schrauben der Qualität " Inbus Plus " verwenden, die durch eine farbige Masse (z.B. blau) auf dem Gewinde gekennzeichnet sind. Diese Masse enthält mikroverkapselten Klebstoff, der die Schrauben im Gewinde verklebt und damit zuverlässig gegen das Lösen sichert. Die Aushärtezeit dieses Klebstoffes nach dem Einschrauben beträgt bei Raumtemperatur (20°C) ca. 4-5 Stunden für eine ausreichende Wirkung. Vorher sollte die Kupplung nicht in Betrieb genommen werden. Vollaushärtung ist nach 24 Stunden gegeben. Höhere Temperaturen beschleunigen die Härtung, z.B. beträgt die Härtezeit nur noch 15 Minuten bei 70°C (Erwärmung durch Warmluftgebläse). Inbus Plus ist temperaturbeständig von -80 bis + 90°C, und die Schrauben können max. 3mal wieder benutzt werden. Eventuell beim Einschrauben vom Gewinde abgestreifter Klebstoff setzt sich zwischen Nabe und Aluteil. Das ist nicht nachteilig, sondern sogar vorteilhaft, weil dadurch der Reibschluß zwischen diesen Teilen erhöht wird.

Achtung: Anaerobe Klebstoffe (wie Loctite, Omnifit usw.) lösen die Haftung des Gummis am Metall und zerstören somit die Kupplung. Daher sollten diese Klebstoffe nach Möglichkeit nicht benutzt werden. Wenn die Verwendung des Klebstoffes unumgänglich ist (z. B. zur Sicherung von Schrauben), dann sehr sparsam auftragen, damit kein überschüssiger Klebstoff das Gummi benetzt. Durch Klebstoffe defekt gewordene Gummiteile können wir nicht als Reklamation anerkennen.

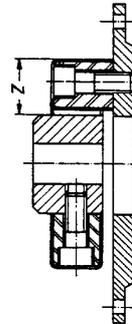
Centaloc Klemmnabe

Falls die Naben mit Centaloc Klemmung ausgerüstet sind, müssen diese Klemmschrauben mindestens mit nachstehenden Drehmomenten angezogen werden:

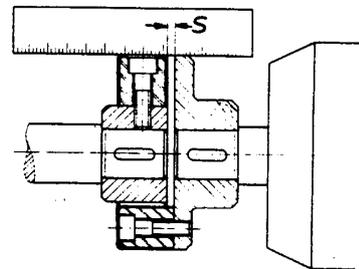
Klemmschrauben	Anziehdrehmoment (Nm)
M 10	30
M 12	50
M 14	70
M 16	120
M 20	200

Position der zyl. Naben:

Das längere Ende der zyl. Nabe, meistens durch eine starke Schräge gekennzeichnet, ist normalerweise gemäß den untenstehenden Zeichnungen angeordnet. Bei manchen Sonderausführungen muß die Nabe jedoch umgekehrt eingebaut werden. Daher muß sie im Zweifelsfall gemäß der speziellen Einbauzeichnung montiert werden.



- e) Nach der Montage der Kupplung ist diese sorgfältig auszurichten, falls die gekuppelten Aggregate nicht bereits durch Zusammenflanschen gut fluchten. Je höher die Drehzahl der Kupplung, desto sorgfältiger sollte die Ausrichtung erfolgen im Interesse einer langen Lebensdauer der Kupplung. Bei der Bauform 2 kann die Fluchtung sehr leicht durch ein Lineal kontrolliert werden. Dabei muß der Außendurchmesser der Flanschnabe und der Außendurchmesser des Gummielementes an den Stellen, wo die Radialschrauben sitzen, miteinander fluchten; und zwar in verschiedenen Ebenen.
- f) Die Kupplung ist vollkommen wartungsfrei und erfordert keinerlei Schmierung. Die Benetzung mit Öl und ähnlichen Stoffen sollte vermieden werden, da Naturgummi nicht ölbeständig ist. Gelegentliche geringe Kontakte mit Öl oder Fett sind nicht schädlich, da dieses Öl beim Drehen der Kupplung wieder abgeschleudert wird.



- g) Übersichtstabelle : Schraubenlängen und Maß " S " zwischen den Naben.

CF Größe	1	2	4	8/12	16/22	25/28	30	50/80	90	140	200	250
Normal-Bauf.	M6x10 M6x25	M8x20	M8x25	M10x30	M12x35	M14x40	M16x50	M16x50	M20x65	M20x65	M20x65	M20x80
Bauform „S“ Steckbolzen Schrauben	M6 M6x10	M8 M8x20	M8 M8x25	M10 M10x30	M12 M12x35	M14 M14x40	M16 M16x50	M16 M16x50	M20 M20x65	M20 M20x65	M20 M20x65	M20 M20x80
Gelenkwelle G	M6x10 M6x25	M8x20	M8x25	M10x30	M12x35	M14x40	M16x50	M16x50	M20x65	M20x65	M20x65	M20x80
Gelenkwelle radial GZ axial	M6x10 M6x30	M8x20 M8x25	M8x25 M8x30	M10x30 M10x35	M12x35 M12x40	M14x40 M14x45	M16x50 M16x55	M16x50 M16x55	M20x70	M20x70	M20x70	M20x80 M20x90
Maß „S“ mm	2	4	4	4	6	6	8	8/4	8	8	8	8
Maß „Z“ mm	13	22,5	27,5	30/31	40	42,5	50	50/52,5	67,5	67,5	77,5	90



CENTA ANTRIEBE
Kirschey GmbH

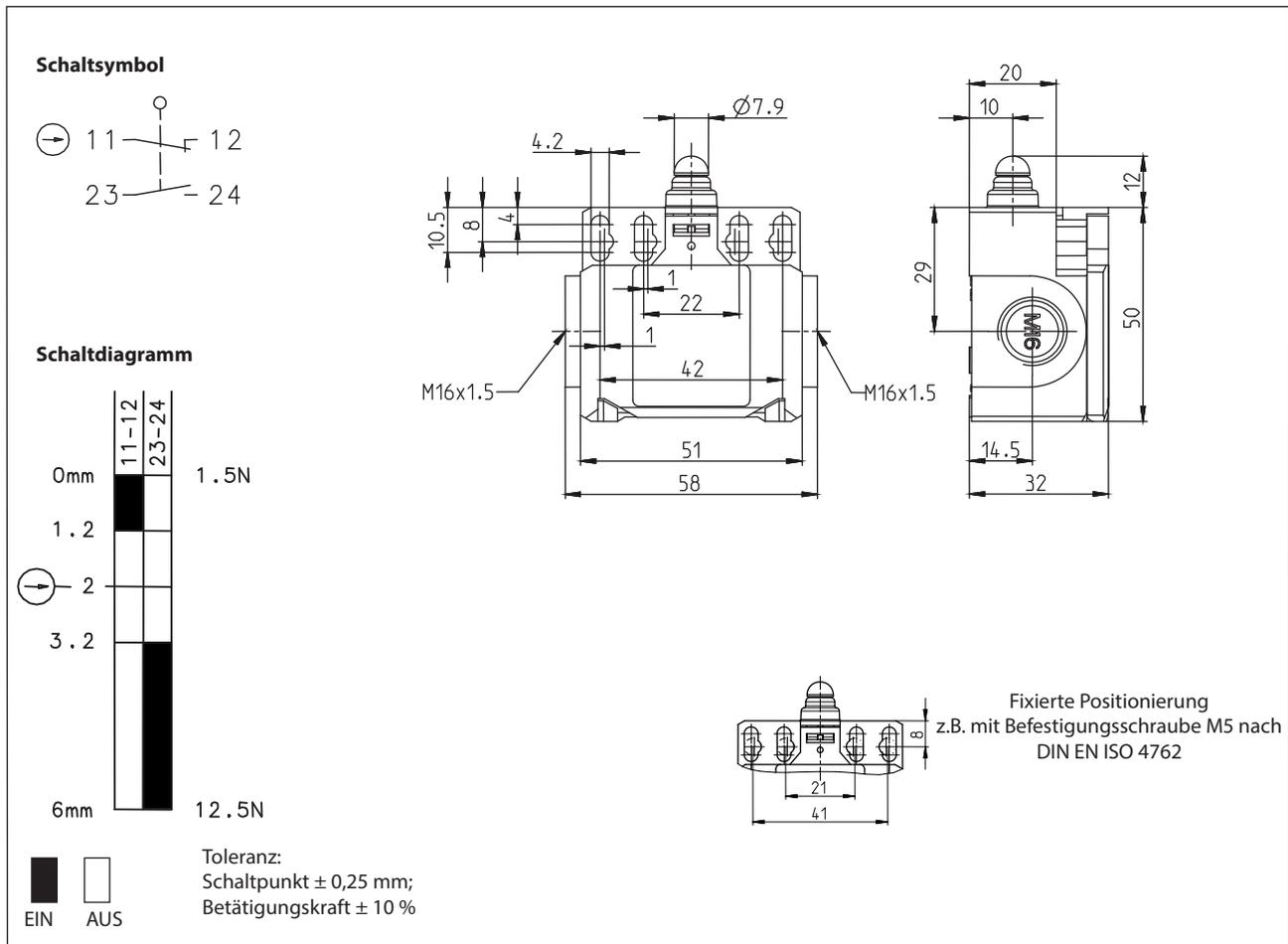
D-42755 Haan Postfach 11 25 Bergische Straße 7
Tel.: 021 29-9 12-0 Fax: 021 29-2790

Kunststoffschalter

Baureihe BI2

Typbezeichnung **BI2-U1Z W**

Artikelnummer **6085103100**



Elektrische Daten		
Bemessungsisolationspannung	U_i	400 V AC
Konv. thermischer Strom	I_{the}	10 A
Bemessungsbetriebsspannung	U_e	240 V AC
nach $c_{CSA_{US}}$	U_e	300 V AC
Gebrauchskategorie		AC15 U_e / I_e 240 V / 3 A
Zwangsöffnung	\oplus	nach IEC/EN 60947-5-1, Anhang K
Kurzschlusschutzeinrichtung		Schmelzsicherung 10 A gG
Schutzklasse		II (schutzisoliert)

Mechanische Daten	
Gehäuse	Thermoplast, glasfaserverstärkt
Deckel	Thermoplast, glasfaserverstärkt
Betätigung	Stößel (Thermoplast)
Umgebungstemperatur	-30 °C ... +80 °C
Kontaktart	1 Öffner, 1 Schließer (Zb)
Mechanische Lebensdauer	10 x 10 ⁶ Schaltspiele
Schalthäufigkeit	≤ 100 / min.
Befestigung	2 x M4 / 2 x M5 / 2 x M3 Frontbefestigung
Anschlussart	4 Schraubanschlüsse (M3,5)
Leiterquerschnitte	Eindrähtig 0,5 – 1,5 mm ² oder Litze mit Aderendhülse 0,5 – 1,5 mm ²
Kabeleinführung	2 x M16 x1,5
Gewicht	≈ 0,08 kg
Einbaulage	beliebig
Schutzart	IP65 nach IEC/EN 60529; DIN VDE 0470 T1

Kennzahlen für Sicherheitstechnik	
B10d	20 x 10 ⁶ Zyklen

Anfahrmöglichkeiten	
Die angegebenen Daten beziehen sich auf Betätigung in Stößelrichtung. Bei seitlicher Betätigung kann sich die Lebensdauer des Schalters verringern.	

Vorschriften	
	VDE 0660 T100, DIN EN 60947-1, IEC 60947-1
	VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1
	DIN EN ISO 13849-1

EU-Konformität	
	nach Richtlinie 2014/35/EU

Zulassungen	
	cCSA _{US} A300, Q300
	CCC

Bemerkungen	
Spezifizierte Schutzart (IP-Code) gilt nur bei geschlossenem Deckel und Verwendung einer mindestens gleichwertigen Kabelverschraubung mit entsprechendem Kabel.	

EU-Konformitätserklärung / EU Declaration of Conformity / Déclaration UE de conformité

Diese Konformitätserklärung entspricht der europäischen Norm DIN EN ISO/IEC 17050-1: Konformitätsbewertung – Konformitätserklärung von Anbietern – Teil 1: Allgemeine Anforderungen. Die Grundlage der Kriterien sind internationale Dokumente, insbesondere ISO/IEC-Leitfaden 22, 1982, Informations on manufacturer's declaration of conformity with standards or other technical specifications. Die deutsche Sprachfassung ist die Originalkonformitätserklärung. Bei anderen Sprachen handelt es sich um die Übersetzung der Originalkonformitätserklärung.

This Declaration of Conformity is suitable to the European Standard EN ISO/IEC 17050-1: Conformity assessment – Supplier's declaration of conformity – Part 1: General requirements. The basis for the criteria has been found in international documentation, particularly in: ISO/IEC Guide 22, 1982, Informations on manufacturer's declaration of conformity with standards or other technical specifications. The original Declaration of Conformity is the German language version. Other languages are a translation of the original Declaration of Conformity.

Cette déclaration de conformité correspond au Norme Européenne EN ISO/IEC 17050-1 : Évaluation de la conformité – Déclaration de conformité du fournisseur – Partie 1 : Exigences générales. La base des directives sont des documents internationaux répondant à ISO/IEC-Guide 22, 1982, Informations on manufacturer's declaration of conformity with standards or other technical specifications. La version allemande est la langue d'origine de la déclaration de conformité. Les autres langues ne sont qu'une traduction de la déclaration de conformité en langue allemande.

Wir / We / Nous

BERNSTEIN AG

(Name des Anbieters) / (Supplier's name) / (Nom du fournisseur)

**Hans-Bernstein-Straße 1
D-32457 Porta Westfalica**

(Anschrift) / (Address) / (Adresse)

erklären in alleiniger Verantwortung, dass das (die) Produkt(e):
declare under our sole responsibility that the product(s):
déclarons sous notre seule responsabilité que le(s) produit(s) :

Bi2-U1Z w Artikelnummer 608.5103.100

(Bezeichnung, Typ oder Modell, Los-, Chargen- oder Serien-Nr., möglichst Herkunft und Stückzahl)
(Name, type or model, batch or serial number, possibly sources and number of items)
(Nom, type ou modèle, n° de lot, d'échantillon ou de série, éventuellement les sources et le nombre d'exemplaires)

mit folgenden Europäischen Richtlinien übereinstimmt (übereinstimmen):
is (are) in conformity with the following directives:
est (sont) conforme(s) aux directives européennes :

Niederspannungsrichtlinie-Nr.: 2014/35/EU

Dies wird nachgewiesen durch die Einhaltung folgender Norm(en):
This is documented by the accordance with the following standard(s):
Notre justification est l'observation de la (des) norme(s) suivante(s) :

**DIN EN 60947-1 : 2011-10
DIN EN 60947-5-1 : 2010-04**

Porta Westfalica, 24.10.2016

(Ort und Datum der Ausstellung):
(place and date of issue):
(date et lieu d'établissement) :



Gisela Bernstein

Vorstandsvorsitzende/Chairwoman of the Board

(Name, Funktion) (Unterschrift):
(name, function) (signature):
(nom, fonction) (signature) :







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05/2025